Managed 7-port 10/100 Mbps + 2-slot Fiber + 1 console port Industrial Switch

INS-803/INS-803W

User's Manual

(For Wider operating temperature range of -40℃ ~ 70℃, use INS-803W)

3rd Edition, March 2008

VOLKTEK
Optical Ethernet Experts

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CE

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

Take special care to read and understand all content given in the warning boxes

Warning

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1 About This Guide

Welcome

Thank you for choosing the INS-803 7-port 10/100TX + 2-slot fiber 100FX + 1-console port (RJ-45) Managed Industrial Switch. This device integrates cutting-edge 100Mbps Fast Ethernet (copper and fiber) and 10Mbps Ethernet switching technologies with versatile management capabilities in a highly flexible package.

Purpose

This guide discusses how to install and configure your Managed Industrial Switch.

Terms / Usage

In this guide, the term “Switch” (first letter upper case) refers to your INS-803 Switch, and “switch” (first letter lower case) refers to other switches.

Features

- Seven (7) 10/100Base-TX, Two (2) 100Base-FX (SFP-type fiber transceivers) and One (1) Console port (RJ-45)
- Rugged, hardened IP30 Case
- Vibration/Shock operational
- Power terminal block
- DIP switches to enable or disable alarm functions
- Under and over-power detection function
- Wide voltage range (9~48V)
- SNMP management application software (HP Open View and IBM/Tivoli NetView capable)
- Http/Web browser user interface, CLI and Menu driven user interfaces via both console and telnet
- Xpress Ring (redundant ring) with less than 50ms recovery time
- Auto-negotiation NWay on RJ-45 port

- Remote & local management
- Extends fiber distance to 2km (6600 feet) for multi-mode and up to 120km (396000 feet) for long-haul single-mode fiber
- Status LEDs for quick and easy network activity monitoring
- Firmware upgradeable
- Console Port (RJ-45)- Use this port for out-of-band device management. Configure the device through a Terminal Emulator /TELNET Program
- RJ-45 Ethernet port supports auto MDI/MDI-X. Fiber Port**-** Connect various fiber optic cables (multi-mode, single mode, long haul single mode, WDM) to the fiber port.
- FCC Class A & CE approved

Specifications

Standards: IEEE 802.3 (10BASE-T Ethernet)
IEEE 802.3u (100BASE-TX/FX Fast Ethernet)
IEEE 802.3x

Connectors: 2 x Single fiber (SFP) LC
7 x RJ-45 (10/100)
1 x RJ-45 (Console Port)

Management

Out-of-band management via Console Port (RJ-45)
In-band management via RJ-45 and fiber ports

Cable Types: UTP: (Cat 5/5e.)
Fiber: Multi-mode (62.5/125 micron)
Single-mode (9/125 micron)

Max. Distances:

UTP: 100 meters (Category 5/5e.)
Fiber: 2,000 meters (multi-mode)

Up to 120,000 meters (single mode)

Data Rates: Ethernet - 10Mbps (half-duplex); 10Mbps (full duplex)
Fast Ethernet - 100Mbps (half-duplex); 200Mbps (full duplex)

Physical Characteristics

Power: Input: 9 ~ 48 V DC

Environment: Operating:
Temperature: -10˚C to 70˚C (-40˚C to 70˚C for INS-803W)
Relative Humidity: 10% to 80%, non-condensing

Non-Operating/Storage:
Temperature: -20˚C to 80˚C (-40˚C to 80˚C for INS-803W)
Relative Humidity: 5% to 90%, non-condensing

Emissions: FCC Part 15 of Class A & CE approved

Dimensions: 120 x 50 x 162mm (D x W x H)

Package Contents

The package should include the following:

- One Managed Industrial Switch
- One console port cable (RJ45 to DB9)
- Din-rail bracket
- Protective caps for unused ports
- Quick Installation Guide

- User’s Manual CD

2 Hardware Description

The Switch was developed with both “Xpress Ring” and “Jet Ring” features. The Jet ring offers recovery time of less than 300ms in case of any network-link failure – and the Xpress Ring can recover from such a failure within 50ms. This makes the switch particularly suited for industrial applications that demand the utmost reliability. The device comes with 7 copper and 2 fiber ports that provide 10/100Base fiber-to-copper conversion. With its industrial design, the INS-803 ensures "always-on" connectivity, eliminating costly network downtime.

Being SNMP-ready, the Switch enables network managers to remotely monitor the entire network’s status quickly and easily via an RJ-45 (in-band), or a console port (out-of-band) connection. This managed Industrial Switch can extend an enterprise’s industrial Ethernet configuration range up to 120km, while simultaneously minimizing troubleshooting time. The Switch is designed with 'plug-n-play' features for hassle-free integration into today's managed mixed-cabling network configurations.

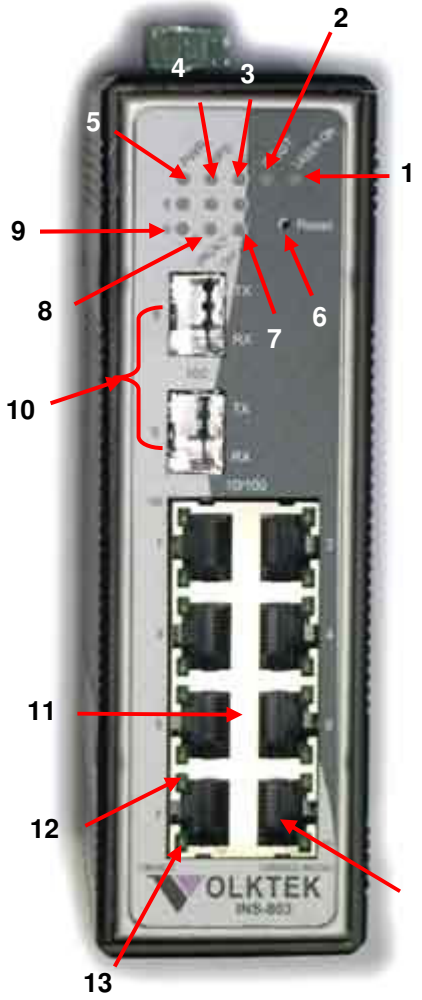
Featuring Auto MDI/MDI-X detection for direct connection to a workstation, switch or hub, network managers no longer need to worry about the cable configuration (cross-over or straight through) when establishing connections between RJ-45 ports.

The Switch has auto-negotiation capabilities that allow it to support connection with leading NWay switches. In full-duplex mode, this unit can sustain distances of up to 2 kilometers (for multi-mode fiber) and 120 kilometers (for long-haul single-mode fiber) between it and a LAN switch or another switch or data/file server.

The Switch features both RJ-45 jacks and LC (SFP-type) fiber-optic connectors that allow it to connect a 10/100Base-TX network to a 100Base-FX (fiber-based) network.

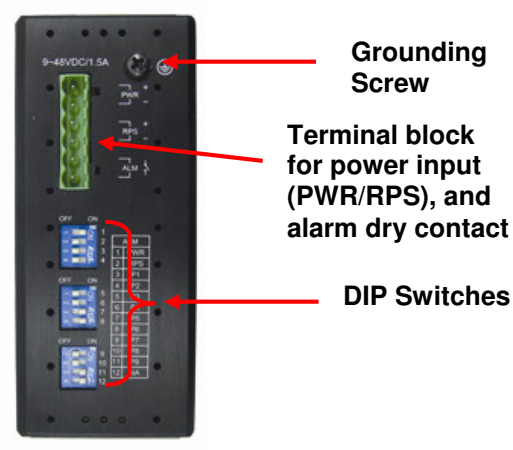
Front View of Switch:

13

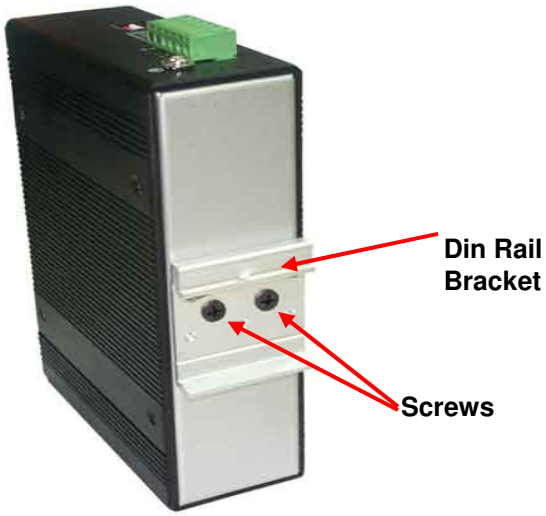


1. LASER ON LED for fiber-optic modules
2. POST LED
3. Alarm LED
4. Redundant Power LED
5. Primary Power LED
6. Reset button
7. Fiber ports OFFLINE LEDs x 2 (1 LED for each port)
8. Fiber ports LNK/ACT LEDs x 2 (1 LED for each port)
9. Fiber ports 100Mbps LEDs x 2 (1 LED for each port)
10. FX-slots for SFP fiber modules (Port 8 & 9)
11. TX-ports 10/100Mbps (7-ports)
12. TX-port 100Mbps LED
13. TX-port LNK/ACT LED
14. RS-232 Console port (RJ-45)

TOP View of Switch



Back View of Switch



Connectors

This Switch utilizes ports with fiber or copper port connectors functioning under Ethernet and/or Fast Ethernet protocols.

10/100BASE-TX Ports

The 10/100BASE-TX ports support network speeds of either 10Mbps or 100Mbps, and can operate in half- and full-duplex transfer modes. The ports also offer automatic MDI/MDI-X crossover detection that gives true "plug and play" capability – just plug the network cables into the ports and the ports will adjust according to the end-node devices. The following are the recommended cables for the RJ-45 connectors:

10M – Cat 3 or better / 100M – Cat 5 or better

100BASE-FX Ports

The 100BASE-FX ports add fiber-based Fast Ethernet links to your network device. Complying with IEEE 802.3u, these ports can transmit data at 100Mbps in full-duplex mode across distances of up to 2km over multi-mode and up to 120km over single-mode fiber-optic cable. The fiber ports have LC-type connectors.

3 Installation

The location selected to install the Switch may greatly affect its performance. When selecting a site, we recommend considering the following rules:

Install the Switch at an **appropriate place**. See *Technical Specifications* for the acceptable temperature and humidity operating ranges.
Fix the provided **brackets** at the back of the Switch to a DIN Rail to protect the switch from falling.

Warning Because invisible laser radiation may be emitted from the aperture of the port when no cable is connected, avoid exposure to laser radiation and do not stare into open apertures.

Getting Connected

The Switch is capable of connecting up to 9 network devices that employ a combination of twisted-pair and fiber cabling and that transmits at either Ethernet or Fast Ethernet speeds.

Powering On

The Switch uses a DC power supply of 9~48V DC. The power and redundant power connection is provided via a terminal block located at the top of the Switch. The Switch's power supply automatically self-adjusts to the local power source and may be powered on without having any or all LAN segment cables connected.

1. Check the front-panel LEDs as the device is powered on to verify that the Power LED is lit. If not, check that the power cable is correctly and securely plugged in.
2. If a Redundant Power Supply is connected, an RPS LED will be illuminated.

Connecting Fiber Cable

When connecting fiber cable to a 100BASE-FX port on the Switch, be sure the correct type (LC) of connector and SFP module is used. Various types of multi-mode, single-mode, or WDM SFP modules are sold separately. Follow the steps below to properly connect the fiber cabling:

1. Remove and keep the fiber port's (LC) rubber covers. When not connected to a fiber cable, the rubber cover should be in place to protect the fiber optics.

2. Plug in the appropriate SFP modules.

3. Check that the fiber terminators are clean. You can clean the cable plugs by wiping gently with a clean tissue or cotton ball moistened with a little ethanol. Dirty fiber terminators on fiber cables will impair the quality of the light transmitted through the cable and lead to degraded performance on the port.

4. Connect one end of the cable to the LC port on the Switch and the other end to the fiber port of the other device.

NB: When inserting the cable, be sure the tab on the plug clicks into position to ensure that it is properly connected.

5. Check the corresponding port LED on the Switch to be sure that the connection is valid. (Refer to the LED chart)

Connecting Copper Cable

The Switch's 10/100BASE-TX RJ-45 Ethernet ports fully support auto-sensing and auto-negotiation.

1. Insert one end of a Category 3/4/5/5e-type twisted-pair cable into an available RJ-45 port on the Switch and the other end into the port of the selected network node.
2. Check the corresponding port LED on the Switch to be sure that the connection is valid. (Refer to LED chart)

Connecting Console Port Cable

The console port (RJ-45) provides the out-of-band management facility.

1 Insert the RJ-45 side of the (8-pin RJ45 to DB9) cable into the RJ-45 console port on the Switch and the other end into the COM port of the computer.

2 Configure the Hyper Terminal settings as mentioned in chapter 5.

For console port (8 pin RJ-45) pin assignment, please see **Appendix A.**

NOTE: See hardware installation guide of INS-803 – which can be found on VOLKTEK's website (www.voltek.com) – for further details about how to configure redundant DC power and relay output.

4 LED Indicators and DIP Switches

This Switch is equipped with Unit LEDs to enable you to quickly determine the status of the Switch, as well as Port LEDs to see what is happening across your connection. They are as follows:

Unit LEDs		
LED	**Condition**	**Status**
PWR	On (Green)	Switch uses primary power
	Off	Primary power off or failure
RPS	On (Green)	Switch uses redundant power
	Off	Redundant power off or failure
ALM	On (Red)	Illuminated when power fails or link fails or ring fails (for Arbiter node)
	Off	No alarm to report
POST	Flashing (Green)	Indicating POST function upon start-up
	On	POST function successfully performed
LASER ON	On (Yellow)	Illuminated when fiber port is in use
	Off	No fiber port is in use
LNK/ACT (8~9)	On (Green)	Illuminated when connectors are attached
	Flashing (Green)	Data traffic passing through fiber port
	Off	No valid link established on fiber port
8 and 9	On (Green)	Fiber ports 100Mbps (1 LED for each port)
OFF LINE	Off	Both SFP devices are properly plug-in
	On (Red)	illuminated Red when SFP device does not exist
Port LEDs		
LED	**Condition**	**Status**
100 (Copper Ports)	On (Green)	Port operating at 100Mbps
	Off	Port operating at below 100Mbps
LNK/ACT	On (Green)	Illuminated when connectors are attached
	Flashing (Green)	Data traffic passing through port
	Off	No valid link established on port

Reset Button		
Reset[2]	Press the button for 2 seconds and release	Restart the system
	Press the button for 5 seconds and release	Set the Switch to factory default value

NOTE 1: The fiber module does not support "half-duplex" mode.

NOTE 2: Use a pointed object like straightened paper clip or toothpick to press the Reset button.

On the top side of the INS-803 there are DIP switches to configure the alarm and arbiter configurations. The meaning of the DIP switch settings are described below:

DIP Switches		
No.	**Name**	**Description**
1	PWR	ON: Master power alarm reporting is enabled OFF: Master power alarm reporting is disabled
2	RPS	ON: Redundant power alarm reporting is enabled OFF: Redundant power alarm reporting is disabled
3	P1	ON: port 1 link alarm reporting is enabled. OFF: port 1 link alarm reporting is enabled.
4	P2	ON: port 2 link alarm reporting is enabled. OFF: port 2 link alarm reporting is disabled.
5	P3	ON: port 3 link alarm reporting is enabled. OFF: port 3 link alarm reporting is disabled.
6	P4	ON: port 4 link alarm reporting is enabled. OFF: port 4 link alarm reporting is disabled.
7	P5	ON: port 5 link alarm reporting is enabled. OFF: port 5 link alarm reporting is disabled.
8	P6	ON: port 6 link alarm reporting is enabled. OFF: port 6 link alarm reporting is disabled.
9	P7	ON: port 7 link alarm reporting is enabled. OFF: port 7 link alarm reporting is disabled.
10	P8	ON: port 8 (SFP) link alarm reporting is enabled. OFF: port 8 (SFP) link alarm reporting is disabled.
11	P9	ON: port 9 (SFP) link alarm reporting is enabled. OFF: port 9 (SFP) link alarm reporting is disabled.
12	NA	Not Applicable

Jet Ring – for Communication Reliability

Setting up Jet Ring (redundant linking) on your network helps to protect critical links against failure and network loops; and it reduces network downtime to less than 300ms.

The Jet Ring function allows users to set up a redundant path in the network to provide a backup data-transmission route in the event that a connection is abruptly disconnected or damaged. This is an extremely important feature in industrial applications because a link failure in a link with no backup can cause several minutes of network downtime and thus cause heavy losses.

How Jet Ring Recovers in less than 300ms

The Jet Ring (a VOLKTEK proprietary name) protocol is designed to optimize redundant communication linking and deliver a very fast link-recovery period. The Jet Ring automatically identifies one switch as the "master" of the network, and then automatically blocks ports to prevent packets from traveling through any of the network's redundant loop segments. If one segment of this ring becomes disconnected from the rest of the network because of a link failure, the Jet Ring protocol automatically re-adjusts the ring so that the part of the network that was disconnected, re-establishes contact with the rest of the network.

The user does not need to designate the master switch to use Jet Ring, this is done automatically.

The Jet Ring ensures smooth operation of industrial automation devices in many critical applications. It will put your automation system back to full operability in less than 300ms if any node of your network goes down.

Step 1
You can apply the ring in the diagram below by connecting 4 units of INS-803.

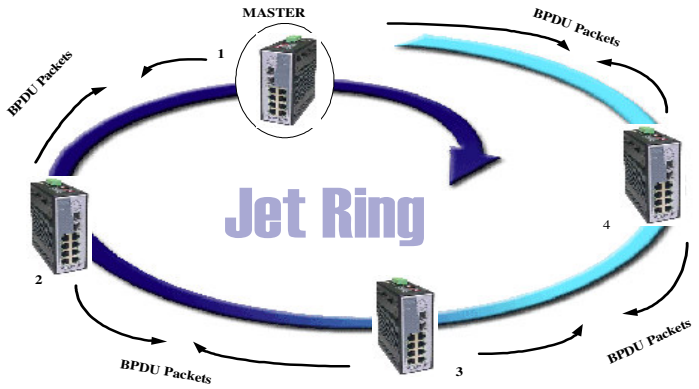


Fig.2

Step 2

Jet Ring then automatically selects the Arbiter switch and the network is ready**.**

Xpress Ring

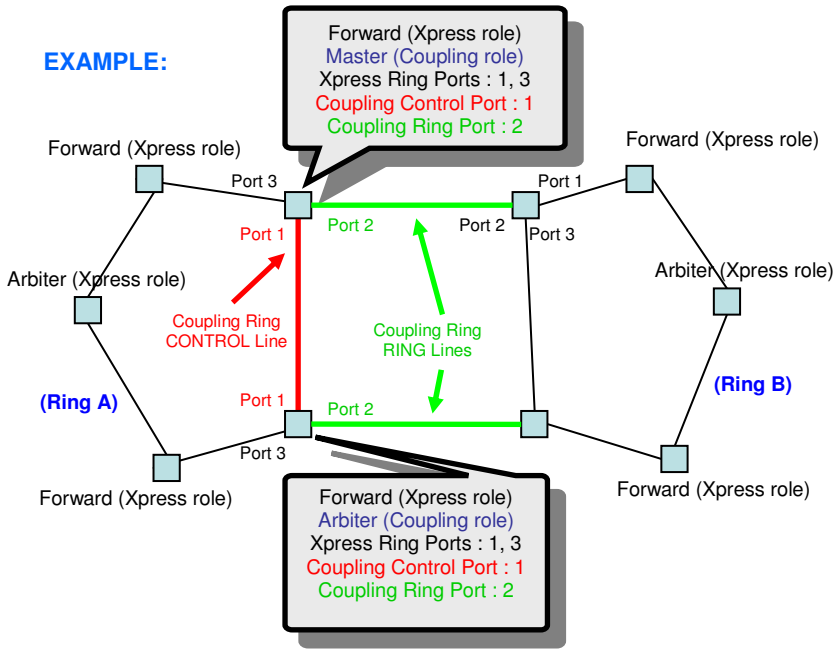
Xpress Ring is a VOLKTEK proprietary ring protocol that enables networks to recover from link failure within 50ms. Unlike Jet Ring, it needs some network configuration efforts: The user must assign two ring ports for each Switch in the ring. The user must also assign the Arbiter Switch which will decide if it is necessary to activate the backup path. For Xpress Ring, any switch can be the arbiter – just remember that the arbiter switch must be part of the ring.

Apart from rerouting the transmission within 50ms, the Arbiter Switch will also issue an alarm when a link failure occurs. The user will then be informed of the failure and will be able to fix the problem and reconfigure if required.
Xpress Ring is the faster ring recovery technology and is ideal for networks where the ring topology is not changed very often.
Please refer to the following chapter for the configuration of the Xpress Ring.

Coupling Ring

The Coupling Ring function connects two Xpress Rings via redundant links (Primary Link & Secondary Link). Please refer to the following

illustration. When the primary link (port 2 at the Master Switch of coupling role) fails, the secondary link (port 2 at the Arbiter Switch of coupling role) will automatically kick in within milliseconds. The Secondary Link is blocked during normal operations, and it is enabled automatically when the Primary Link is disconnected. The Secondary Link is blocked again automatically when the Primary Link recovers.
Control Line of Coupling Ring (port 1 at the Master Switch of coupling role / port 1 at the Arbiter Switch of coupling role) is used for negotiation between Master and Arbiter Switches of coupling role and to decide when the secondary link should be enabled or blocked. It is needed to set coupling roles as “Master”, “Arbiter”, or “Normal” (all other Switches not Master neither Arbiter) to Switches in the Xpress Ring, and assign coupling’s ring and control ports to the Master and Arbiter Switches, to one side only of two interconnected rings.
Coupling Ring is designed based on Xpress Ring. For configuring the Coupling Ring feature, please consult the appropriate chapter in this manual.



6 Configuration

Overview of Configuration Options

For advanced management capabilities, the onboard management agent provides CLI and menu-driven interface configuration programs. These programs can be accessed by a direct or modem connection to the console port on the front panel (out-of-band), or by a Telnet connection over the network (in-band).

The management agent is based on SNMP (Simple Network Management Protocol). This SNMP agent permits the switch to be managed from any PC in the network by using in-band management software.

The management agent also includes an embedded HTTP Web agent. This Web agent can be accessed using a standard Web browser from any computer attached to the network.

The switch gives you the flexibility to access and manage it by using any or all of the methods described. The administration console and web browser interfaces are embedded in the switch software and can be used immediately after setup.

External SNMP-based network management application

Advantages

- Communicates with switch functions at the MIB level
- Based on open standards

The three methods for configuring the Switch management agent are explained in this chapter.
The first method – Command Line Interface (CLI) via the Console Port to initially set IP parameters – is explained in part A.
The second is Menu Driven configurations via Telnet – explained in part B.
Part C explains the use of an Internet Browser Interface to configure the Switch.
Part D provides some basic operational examples for using CLI via Telnet. **Complete part A and then proceed to either part B, C, or D.**

A - Console Port

Out-of-Band Connection

Prior to accessing the switch's onboard agent via a network connection, you must first configure it with a valid IP address, subnet mask, and default gateway using an out-of-band connection or the BOOTP protocol.

After configuring the switch's IP parameters, you can access the onboard configuration program from anywhere within the attached network or via internet. The onboard configuration program can be accessed using Telnet from any computer attached to the network. It can also be managed from any computer using a Web browser (Internet Explorer 4.0 or above, or Netscape Navigator 4.0 or above).

Access the Switch via a terminal emulator (such as Hyper Terminal) attached to the console port. The console port is set at the factory with the following default COM port properties. Configure your own terminal to match the following:

- Baud rate: 38,400
- Data size: 8bits
- Parity: None
- Stop bits: 1
- Flow Control: None

NOTE: Ensure that the terminal or PC you are using to make this connection is configured to match the above settings. Otherwise the connection will not work.

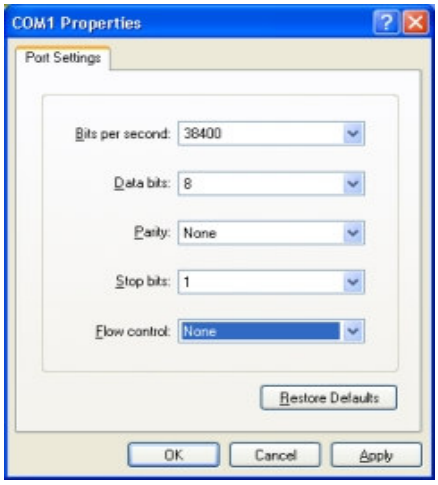
A console port cable is provided with the Switch to connect the PC's COM port with the Switch's serial console (RJ-45) port. Please see Appendix A for cable pin assignment details.

Connecting a HyperTerminal

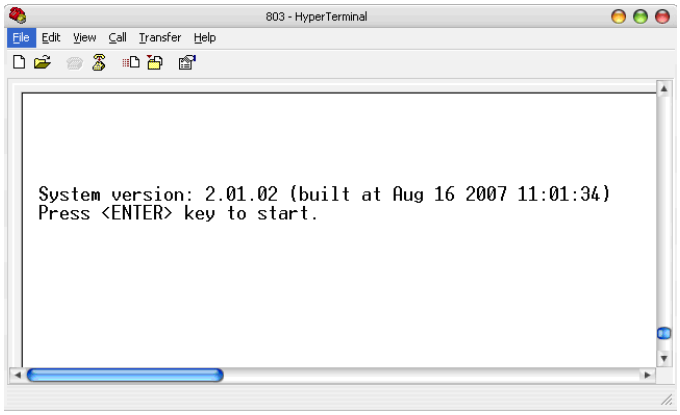
Prior to following the instructions listed below for HyperTerminal, verify that a console cable (RJ45 to DB9) connection between the Switch and work station exists. Then follow the steps below:

1. Launch the terminal emulation program on the remote workstation and power on the Switch. Be sure to select the correct COM port.

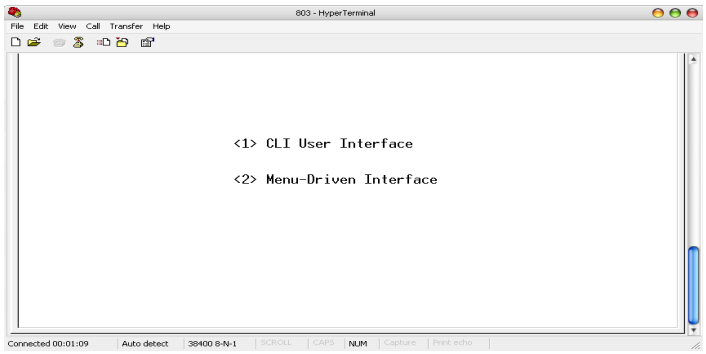
2. Enter the correct parameters according to the defaults given above.



1. The following screen will appear after selecting “OK”. Press <ENTER> to start and move to the “Log-in” screen.



2. The default log-in name is “admin” with no preset password. The system provides both CLI and menu-driven user interfaces via console or telnet. After you log into the system, you will see a welcome message as below:

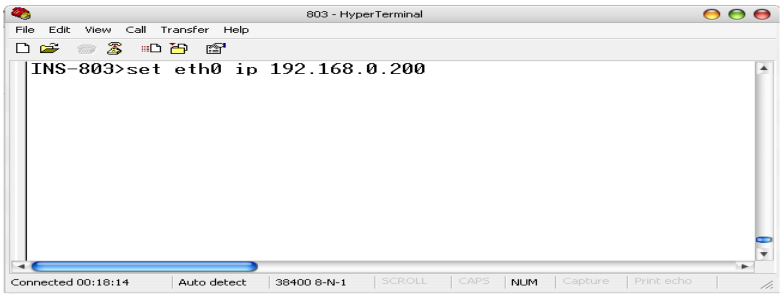


3. Type 1 to select **CLI operations**

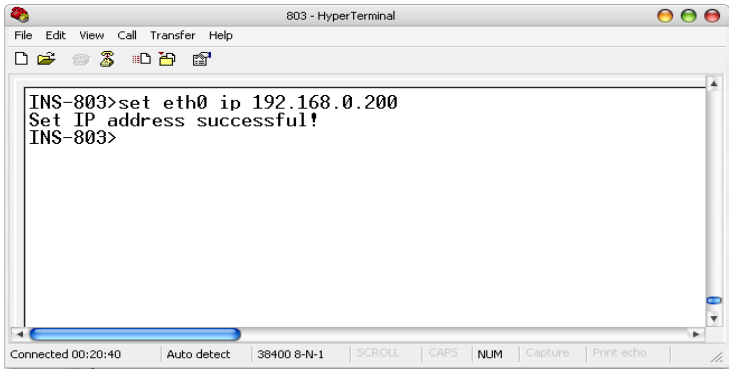
After log-in, type the following command to change the device’s IP address, Network Mask and Gateway Address:

set eth0 ip xxx.xxx.xxx.xxx
set eth0 netmask xxx.xxx.xxx.xxx
set eth0 gateway xxx.xxx.xxx.xxx

The **xxx**'s represent values between **0** and **255** and the user should enter their own IP address in this form. The configuration program will not accept anything outside this format. Remember to separate each part of the address with a period (dot). For example:



After entering the new IP address, the system will confirm whether the operation was successful.



4. The system will restart automatically

When the address has been changed, please make a note of the new address, and keep it in a safe place. With HyperTerminal, the command lines are the same as that for telnet. Users can continue to use Hyper Terminal along with the instructions given in part D (p66). Otherwise, log out by typing exit and pressing the <**ENTER>** key. Then, the user can choose to configure the Switch via HTTP web browser or telnet with Menu Driven or Command Line interfaces.

Note: ***IP addresses are unique. If an address isn't available, please contact the appropriate authorities to apply for one.***

B – Menu-driven User Interface via Telnet

This section gives a step-by-step guide to configuring the Switch management functions. A series of screen shots (SS#) and instructions illustrates the main menu structure, and how it works.

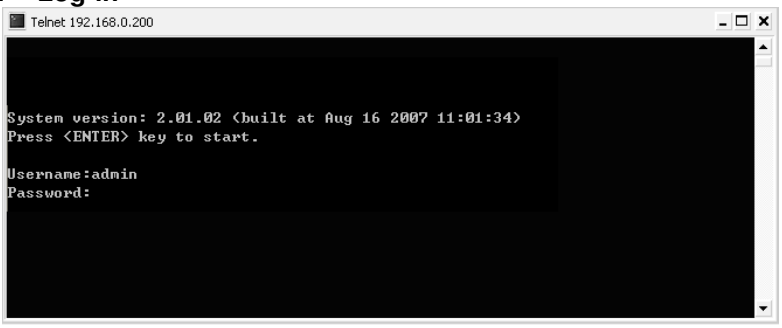
1. Open a Command Prompt window and type

   telnet xxx.xxx.xxx.xxx where the xxx's represent the IP address.

   As an example, we'll continue to use the IP address configured in part A of this manual: 192.168.0.200

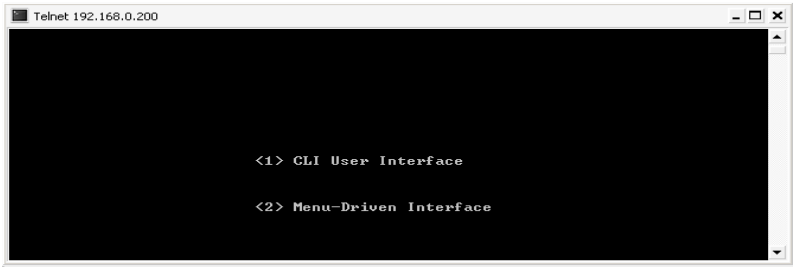
2. Then "**Press <ENTER> key to start**"

SS1 – Log-in



3. The default log-in name is "admin" with no preset password. The system provides both CLI and menu-driven user interfaces via console or telnet. After you log into the system, you will see a welcome message as below:

SS2 - Welcome



4. Select Menu-Driven, the system will launch the following:

SS3 - Main Menu

Use the <Tab> to move up and down the menu, and the <Enter> key to select. Choose the following operations from the main menu system. See description below:

Parameter	Description
Systems Information Menu	Provides default system information. i.e. IP Address, Network Mask, Gateway, etc.
DHCP Configuration Menu	Disabled – or Enabled with DHCP Client State, DHCP Leased Time in seconds, DHCP Expiry Time in seconds
Device Control menu	Provides configuration options for ports, Bridge menu, VLAN menu, and Jumbo Packet / Multicast Rate limit menu
Management Setup Menu	Provides SNMP, E-mail alarm Configurations menu and firmware upload menu
Port Counter Menu	Provides the ports status view at a glance
System Restart Menu	This menu provides options to the user for restarting the switch through software and/or restore the factory default settings
Exit	Return to Main Menu

SS4 - System Information

System Information
Description : 7+2 Managed Industrial Switch
Model Name : INS-803
Company Name : VOLKTEK Corporation
Board Name : 6700-00803-1101
MAC-1 Address : 00:0B:04:11:11:11
Slot Number : 9
Power Status : 1 ON
DHCP Client : Disabled
IP Address : 192.168.9.55
Subnet Mask : 255.255.0.0
Gateway : 192.168.0.1

Use the <**Tab**> key to move from one field to the next and the <**Enter**> key to get a text prompt. Press <**Enter**> to exit the field. Select <**SAVE**> after editing, or <**ESC**> to return to the Main Menu system (all unsaved work will return to default or the last saved values). Set IP Address, Subnet Mask, and Gateway on this page. See descriptions below:

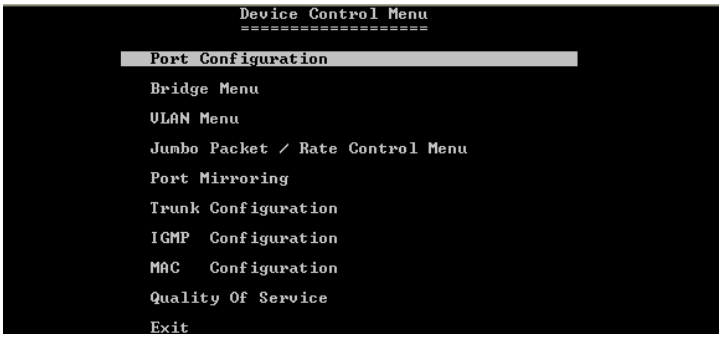
Parameter	Description
Description	Provides description of the Switch
Model No	Shows Model No
Company Name	Manufacturer's Company Name
Board Name	Information about the Board used in the Switch
MAC Address	Display MAC Address of the Switch
Slot number	Total number of Switch's fast Ethernet slots/ports
Power Status	Display the primary and redundant power status
IP Address	Display IP address of the switch. The user can change the IP address as per requirement (Default: 192.168.0.254)
Subnet Mask	Show the subnet mask of the switch, which identifies the host address bits used for routing to specific subnets. User must use the appropriate subnet mask with the assigned IP address (Default: 255.255.255.0)
Gateway	Gateway used to pass trap messages from the system's agent to the management station. User must assign the gateway as per their network configurations (Default: 192.168.0.1)

DHCP Configuration Menu

A choice of either "Disabled" or "Enabled" with DHCP Client State, DHCP Leased Time in seconds and DHCP Expiry Time in seconds

Device Control Menu (DCM)

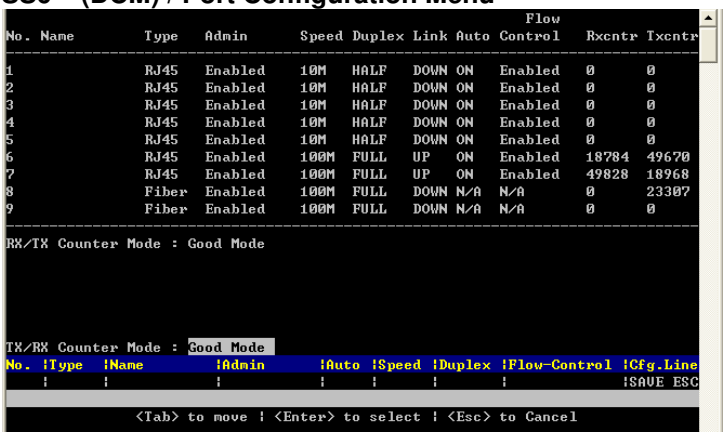
SS5 – Device Control Menu



Use the <**Tab**> to move up and down the menu, and the <**Enter**> key to select and unselect. Choose the following operations from the menu system.

Parameter	Description
Port Configurations Menu	Use this menu to configure various parameters for each port of the Switch.
Bridge Menu	Use this menu for Bridge configurations.
VLAN Menu	Use this menu to configure port-based or tag-based VLANs.
Jumbo Packet / Rate Control Menu	Users can define Jumbo Packet limit and bandwidth/data rate control for each port.
Port Mirror	Options to select a port for mirroring to monitor the traffic.
Trunk Configuration	Configure up to 4 trunk groups.
IGMP Configuration	Configure IGMP snooping, query and check group status.
MAC Configuration	Here you can check the MAC Table Status, lock the MAC Address Learning and do Static Unicast MAC Configuration and Mac Limit Configuration
Quality Of Service	Set the QoS Base Configuration, Tag Priority Table and IP ToS Priority Table
Exit	Return to Main Menu

SS6 – (DCM) / Port Configuration Menu


No. Name Type Admin Speed Duplex Link Auto Flow Control Rxcntr Txcntr
1 RJ45 Enabled 10M HALF DOWN ON Enabled 0 0
2 RJ45 Enabled 10M HALF DOWN ON Enabled 0 0
3 RJ45 Enabled 10M HALF DOWN ON Enabled 0 0
4 RJ45 Enabled 10M HALF DOWN ON Enabled 0 0
5 RJ45 Enabled 10M HALF DOWN ON Enabled 0 0
6 RJ45 Enabled 100M FULL UP ON Enabled 18784 49670
7 RJ45 Enabled 100M FULL UP ON Enabled 49828 18968
8 Fiber Enabled 100M FULL DOWN N/A N/A 0 23307
9 Fiber Enabled 100M FULL DOWN N/A N/A 0 0
RX/TX Counter Mode : Good Mode
TX/RX Counter Mode : Good Mode
No. ¦Type ¦Name ¦Admin ¦Auto ¦Speed ¦Duplex ¦Flow-Control ¦Cfg.Line
¦SAVE ESC
<Tab> to move ¦ <Enter> to select ¦ <Esc> to Cancel

Use the <**Tab**> key to move from one field to next and the <**Enter**> key to select and unselect. Press <**Enter**> to exit the field. Select <**SAVE**> after editing, or <**ESC**> to return to the Main Menu system (all unsaved work will return to default or last saved values).

Parameter	Description
(TX/RX Cntr. Mode)	Gateway to TX/RX Counter Mode configurations
Good Mode	Registers the number of good packets
Error Mode	Registers the number of error, collided, or bad packets
Port No.	Press Enter and Port No. and Enter and Tab in settings panel
Name	Assign a name to each port to keep record of your connections
Type	Type of port connector (A choice of fiber or RJ-45)
Admin	Enable or disable admin configurations
Auto	Enable / Disable Auto-negotiation on copper ports
Speed	Provides information on speed at which ports are operating User can set the speed for RJ-45 ports (10~100Mbps)
Duplex	Provides information on Duplex Status. User can select half / full duplex modes.
Link (status only)	Provides information on link status
Flow Control	Disable or Enable for RJ-45 ports
RXcntr / TXcntr	Shows the packets received and sent by the port

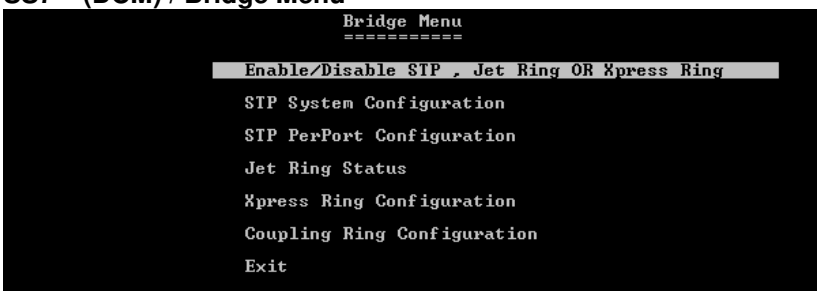
(DCM) / Bridge Menu

The Bridge menu is used to Enable / Disable STP (Spanning Tree Protocol Algorithm), JET Ring or Xpress Ring, as well as to configure the STP settings if STP is enabled.

If Jet Ring is enabled it offers a fast recovery time of less than 300ms in case a node goes down in the ring. Xpress Ring offers a very fast recovery time of less than 50ms.

The Spanning Tree Algorithm is used for detecting and disabling network loops, and to provide backup links between switches, bridges and routers. This allows the switch to communicate and interact with other bridging devices (i.e. STA-compliant devices) in a network to ensure that only one route exists between any two stations, and provide redundant or backup links that automatically take over when a primary link fails.

SS7 – (DCM) / Bridge Menu

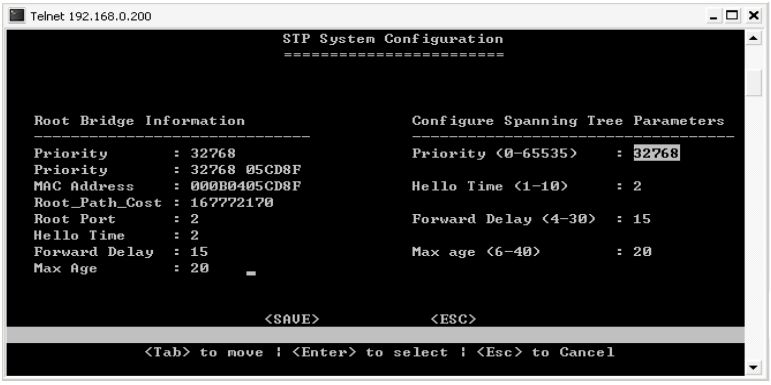


SS8 – (DCM) / Bridge / Enable/Disable STP, Jet Ring or Xpress Ring
Users can Enable/Disable Spanning Tree Protocol, Jet Rin**g or Xpress Ring as** per their network needs. Select the option to choose the parameters.

The default value is “Disabled”. Use the <**Tab**> key to move from one field to next and the <**Enter**> key to select and unselect. Press <**Enter**> to exit the field. Select <**SAVE**> after editing, or <**ESC**> to return to the

Main Menu system (all unsaved configurations will return to default or last saved values).

SS9 – (DCM) / Bridge / STP System Configuration:
Use this option to configure the STP parameters. Before moving to this menu, make sure you select "**STP 802.1D**" mode in previous menu screen (Enable/Disable STP, Jet Ring or Xpress Ring). Otherwise, you wouldn't be able to configure the values.

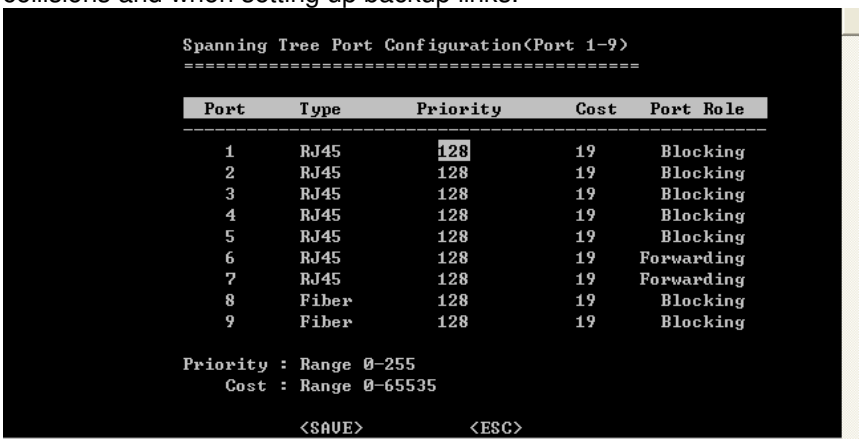

Telnet 192.168.0.200
STP System Configuration
Root Bridge Information
Priority : 32768
Priority : 32768 05CD8F
MAC Address : 000B0405CD8F
Root_Path_Cost : 167772170
Root Port : 2
Hello Time : 2
Forward Delay : 15
Max Age : 20
Configure Spanning Tree Parameters
Priority (0-65535) : 32768
Hello Time (1-10) : 2
Forward Delay (4-30) : 15
Max age (6-40) : 20
<SAVE>
<ESC>
<Tab> to move ! <Enter> to select ! <Esc> to Cancel

On the left side of the window, root bridge information is displayed

Parameter	Description
Bridge Priority	Set the bridge priority. The limit is given between 0 (the highest priority) and 65535 (the lowest priority). Bridge priority is used in selecting the root device, root port, and designated port. The device with the highest priority becomes the STA root device. However, if all devices have the same priority, the device with the lowest MAC address will then become the root device.
Hello Time	Time interval (in seconds) at which the root device transmits a configuration message. The limit given is from 1 – 10 seconds.
Forward Delay	Set Forward Delay. The limit given is from 4 – 30 seconds. This is the maximum time (in seconds) the root device will wait before changing states (i.e., listening to learning to forwarding).
Max. age	Set the (maximum age) waiting time for receiving packets before attempting to reconfigure the link. The limit given is from 6 – 40 seconds.

SS10 – (DCM) / Bridge / STP Per-Port Configurations

STP allows the Switch to assign a priority status to each of its ports, with respect to other networking nodes in the network. In other words, STP determines the best route for data to flow, given the priority level of each node on the network. Ensure that this function is activated to avoid collisions and when setting up backup links.


Spanning Tree Port Configuration(Port 1-9)
Port Type Priority Cost Port Role
1 RJ45 128 19 Blocking
2 RJ45 128 19 Blocking
3 RJ45 128 19 Blocking
4 RJ45 128 19 Blocking
5 RJ45 128 19 Blocking
6 RJ45 128 19 Forwarding
7 RJ45 128 19 Forwarding
8 Fiber 128 19 Blocking
9 Fiber 128 19 Blocking
Priority : Range 0-255
Cost : Range 0-65535
<SAVE>
<ESC>

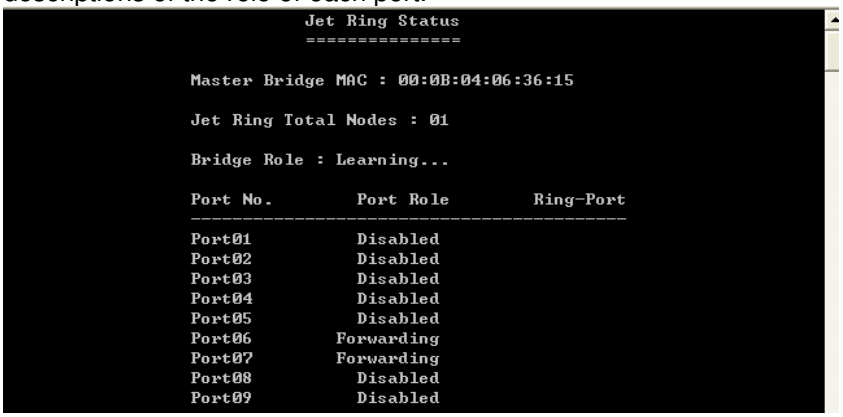
Use the <**Tab**> key to move from one field to the next and the <**Enter**> key to select and unselect. Press <**Enter**> to exit the field. Select <**SAVE**> after editing, or <**ESC**> to return to the Main Menu system (all unsaved work will return to default or last saved values).

Parameter	Description
Port Type Priority	Set the priority of each port. The limit given is from 1-255. The default priority is set to 128 – the midpoint of this limit.
Cost	Set the cost assigned to each port. This will determine the route of information flow.
Port Role	Displays the role of each port (Forwarding or Blocking)

SS11 – (DCM) / Bridge / Jet Ring Status

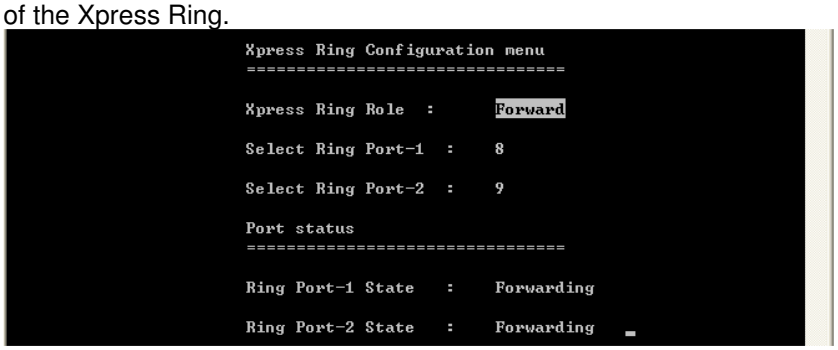
If Jet Ring is enabled, the user can view the Jet Ring status. The INS-803 will automatically detect which port is attached to other INS-803s (or other Jet Ring-enabling VOLKTEK switches) to establish the Jet Ring. The user can see how many nodes are connected in the ring and which

node is working as Master, Arbiter or member. There are also descriptions of the role of each port.



SS12 – (DCM) / Bridge / Xpress Ring Configuration

Once Xpress Ring (sometimes called Jet Ring Plus) is enabled, the user can configure the Xpress Ring. The user can select the role of the switch in the Xpress Ring (Arbiter or Forward) and select which ports will be part of the Xpress Ring.


Xpress Ring Configuration menu
Xpress Ring Role : Forward
Select Ring Port-1 : 8
Select Ring Port-2 : 9
Port status
Ring Port-1 State : Forwarding
Ring Port-2 State : Forwarding

Xpress Ring Role: Arbiter – the Switch which receives status reports submitted from other Switches of the ring and decides the ring recovery behaviors

Forward – the Switch which is not the Arbiter of the ring and will forward the received status reports on the other side of ring ports

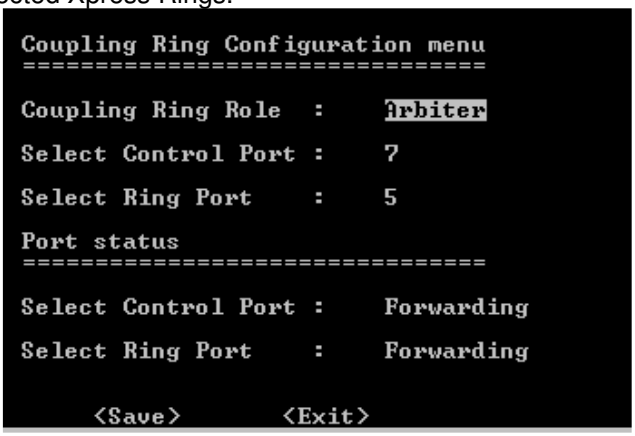
Select Ring Port-1: the first ring port with the link composing part of the Xpress Ring

Select Ring Port-2: the second port with the link composing part of the Xpress Ring

Port status: display the ring port statuses as “Forwarding” for packet transmitting and receiving status, or “Blocking” for port disabled or link down status

Coupling Ring

Set Coupling Ring configurations to all Switches of either side of two interconnected Xpress Rings.


Coupling Ring Configuration menu
Coupling Ring Role : Arbiter
Select Control Port : 7
Select Ring Port : 5
Port status
Select Control Port : Forwarding
Select Ring Port : Forwarding
<Save>
<Exit>

- Coupling Ring Role: Arbiter – the Switch with the backup secondary link to the other Xpress Ring.

  Master – the Switch with the primary link to the other Xpress Ring.

  Normal – the Switches not with the links connecting to other Xpress Ring.
- Select Control Port: the Control Port of Coupling Ring Master Switch or Arbiter Switch for communication with each other.
- Select Ring Port: the Ring Port of Coupling Ring Master Switch or Arbiter Switch for connection to the peer coupled Xpress Ring
- Port status: display the port status of Control Port or Ring Port as “Forwarding” for packet transmitting and receiving status, or “Blocking” for port disabled or link down status

(DCM) / VLAN (Virtual Local Area Networks) Menu

A VLAN is a network of computers behaving as though they are connected to the same LAN segment, even though their physical location

may be on a different LAN altogether. VLANs are configured through software rather than hardware, which make them extremely flexible.

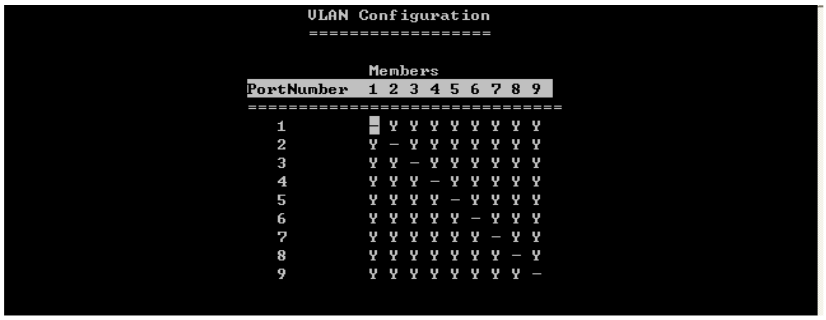
Some of the advantages of VLANs are:

- When a computer is physically moved to another location, it can stay on the same VLAN without any hardware reconfiguration because VLANs are not limited by hardware constraints.
- VLANs can be configured to define a network into various logical configurations. For example, VLANs can define a network by application. In this scenario, a company might create one VLAN for multimedia users and another for e-mail users.
- VLANs can also define a network by department. For example, a company might have one VLAN for its Engineering Department, another for its Marketing Department, and another for its Sales Dept.
- VLANs can also be set up according to the organization's internal structure. For example, the company president might have his/her own VLAN, the executive staff might have a different VLAN, and the remaining employees might have yet another VLAN.

As these examples show, VLANs offer unparalleled flexibility. The following section describes how VLANs can be deployed using the Switch.

VLAN Type
Disable VLAN or select Port-based VLAN or Tag-based VLAN

SS13 – Port-based VLAN configuration
The following is the menu screen for **port-based** VLAN configuration:


VLAN Configuration
Members
PortNumber 1 2 3 4 5 6 7 8 9
1 Y Y Y Y Y Y Y Y
2 Y - Y Y Y Y Y Y
3 Y Y - Y Y Y Y Y
4 Y Y Y - Y Y Y Y
5 Y Y Y Y - Y Y Y
6 Y Y Y Y Y - Y Y
7 Y Y Y Y Y Y - Y
8 Y Y Y Y Y Y Y -
9 Y Y Y Y Y Y Y Y -

Parameter	Description
Port ID Members	Set the VLAN association of one port to another. Blank checks mean no VLAN association. The default is that all ports are associated. Conversely, all ports can be isolated

Use the <**Tab**> key to move from one field to the next and the <**Enter**> key to select and unselect. Press <**Enter**> to exit the field. Select <**SAVE**> after editing, or <**ESC**> to return to the Main Menu system (all unsaved work will return to default or last saved values).

Tag-based VLANs

The concepts of tag-based VLAN:

Tag-based VLAN is the standard implementation of IEEE802.1Q VLAN. With the Switch set as a tag-based VLAN switch, every port has the following:

PVID: Port VLAN ID number, generally referring to the VLAN which the connected non-802.1Q-aware device (like a Device Server or Industrial Computer) belongs to. This PVID can be configured in the menu “Port Information”.

Priority: Priority of the port and the non-802.1Q packets received on the port – generally from a non-802.1Q-aware device. (“Port Info” menu)

Participating VLANs: The VID-tagged packets which are allowed to flow in or out of the port. A port may participate in multiple VLANs, like an uplink port connected to another switch which will transfer the packets from various devices belonging to different VLANs into the network. (BUT, generally, a port connected to a peripheral non-802.1Q device can only participate in 1 VLAN, the same VLAN ID that is selected for that port in the “Port Info” menu). The participating VLANs can be configured in the menu “Add VLAN Group”

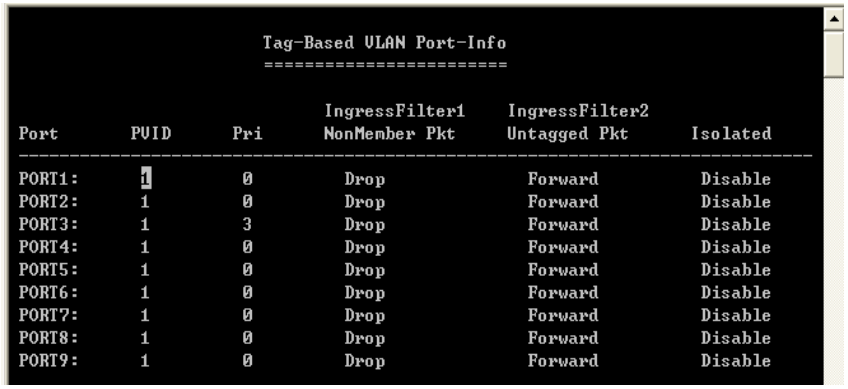
If the port is set in the “Add VLAN Group” menu as a Tagged Port, all packets flowing out of the port will be tagged frames to an 802.1Q switch or device.
If the port is set as an Untagged Port, all packets out of the port will be untagged frames (stripped of their tags at port) to a non-802.1Q device, like an industrial computer.
When a packet is received (ingress) on the port, it is filtered to be dropped or forwarded according to the user-specified rule (configured on

menu “Port Information”) for ingress-filtering untagged frames and tagged frames that are not members of the receiving port’s participating VLANs (configured on menu “Add VLAN Group”).
If the packet is forwarded, the untagged frames, generally from a non-802.1Q-aware peripheral or device, are tagged with the PVID and Priority that were assigned to the Ingress port.

The untagged packets received by an 802.1Q Switch in this way become tagged frames. The tagged frames received on the ingress port are kept unchanged if it’s not dropped.

Next, the Switch switches the frame into the egress port that is a participant of that specific VLAN.
For example: If the ingress is from a peripheral device linked to a downlink port on a switch with only one uplink port and the frame is addressed to a device on another switch, the frame would be switched to egress out of the uplink port – and this UPlink port would be set to participate in the VLANs of all the DOWNlink ports and forward all their traffic.
If the egress port is an “untag” port (normally a port linked to a peripheral, non-802.1Q device that does not accept tagged frames), the VID and priority fields will be stripped off (untagged) from the frame and then transmitted out of the egress port.
A previously tagged frame is simply kept unchanged when it is sent out from a “tagging” egress port, generally to a 802.1Q switch or a standard VLAN-aware device.

SS14 – VLAN Tag-based Port (Ingress) – Info
Here is the above-mentioned menu screen for configuring the TAG-based VLAN port settings (**INGRESS** Behavior).



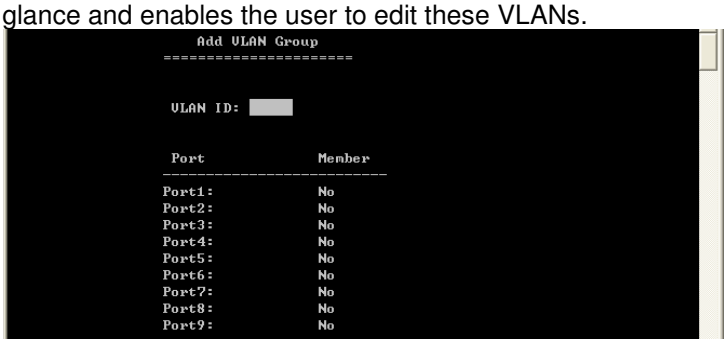
```
                    Tag-Based VLAN Port-Info
                    ========================

                                 IngressFilter1    IngressFilter2
Port       PVID      Pri       NonMember Pkt     Untagged Pkt       Isolated
-------------------------------------------------------------------------------
PORT1:       1         0          Drop              Forward          Disable
PORT2:       1         0          Drop              Forward          Disable
PORT3:       1         3          Drop              Forward          Disable
PORT4:       1         0          Drop              Forward          Disable
PORT5:       1         0          Drop              Forward          Disable
PORT6:       1         0          Drop              Forward          Disable
PORT7:       1         0          Drop              Forward          Disable
PORT8:       1         0          Drop              Forward          Disable
PORT9:       1         0          Drop              Forward          Disable
```

Parameter	Description
VID	Set the VLAN ID. The limit given is between 1 and 4095. The VLAN ID is assigned to all untagged frames received on this port.
Priority	Set VLAN Priority. The limit given is between 0 – 7. 0 is the lowest priority and 7 is the highest priority.
Ingress Filter 1 (Non-Member) and Filter 2 (Untagged)	Non-Member (1): Forward Untagged (2): Forward Forward the VLAN-tagged frames which are not members of any VLAN in which the port is participating, and forward all untagged frames. Non-Member (1): Drop Untagged (2): Forward Drop the VLAN-tagged frames which are not members of any VLAN of which the port is participating, and forward all untagged frames. Non-Member (1): Drop Untagged (2): Drop Drop the VLAN-tagged frames which are not members of any VLAN of which the port is participating, and drop all untagged frames.
Isolated	Enable – The port is isolated. Isolated ports belonging to the same VLAN do not communicate with each other – this is generally set for security reasons. The isolated ports communicate only with the trunk ports, which should NOT be set as “isolated”. Disable – The port is not isolated and can communicate with all ports of the VLANs.

SS15 – Tag-based / Adding VLAN groups (port EGRESS behavior)

Type in VLAN ID number and at each port select “No” (not a member of this specific VLAN – drop packet), “Untagged” (member of VLAN, take tag away so that computer can read) or “Tagged” (keep tag on packet – only for uplink port). The menu “Show VLAN Table” shows all VLANs at a glance and enables the user to edit these VLANs.



SS16 – (DCM) / Jumbo Packet or Rate Control Configuration

Jumbo Packet / Rate Control Configuration
Jumbo Packet Length : 1536 [1522|1536]Bytes
Port Ingress Limit Mode Ingress-Rate Egress-Rate(All Frames)
PORT1 Multi/Broadcast & Flooded unicast 256Kbps 256Kbps
PORT2 Multicast & Broadcast Only 512Kbps Not limited
PORT3 Broadcast Only 1Mbps Not limited
PORT4 Multi/Broadcast & Flooded unicast 8Mbps Not limited
PORT5 All Frames Not limited 1Mbps
PORT6 All Frames Not limited Not limited
PORT7 All Frames Not limited Not limited
PORT8 All Frames Not limited Not limited

Use the <**Tab**> key to move from one field to the next and the <**Enter**> key to select and unselect. Press <**Enter**> to exit the field. Select <**SAVE**> after editing, or <**ESC**> to return to the Main Menu system (all unsaved work will return to default or last saved values).

Parameter	Description

Jumbo Packet Length	Select the size of packets: 1535 – For double-tagged packets or jumbo packets 1522 – For normally tagged packets. 1518 bytes are actually allowed for untagged packets.
Ingress Limit Mode	Users can select the type of frames allowed from the port (All Frames, Broadcast Only, Multicast & Broadcast Only, Multi/Broadcast & Flooded Unicast)
Ingress / Egress Rate	Assign the Ingress and Egress rates to and from the ports (128Kbps, 256Kbps, 512Kbps, 1Mbps, 2Mbps, 4Mbps, 8Mbps)

SS17 – (DCM) / Port Mirroring

This function can be used to monitor data being transmitted through a specific port. It allows the network administrator to "sniff" the observed port and thus keep tabs on network activity.

Use the <**Tab**> key to move from one field to the next and the <**Enter**> key to select and unselect. Press <**Enter**> to exit the field. Select <**SAVE**> after editing, or <**ESC**> to return to the Main Menu system (all unsaved work will return to default or last saved values).

Parameter	Description
Mirror Mode	Select mirror mode (Disable, Ingress & Egress, Ingress)
Monitoring Port	User can select the port number that will do monitoring
Monitored Port / Member	Select the port/s that need to be monitored

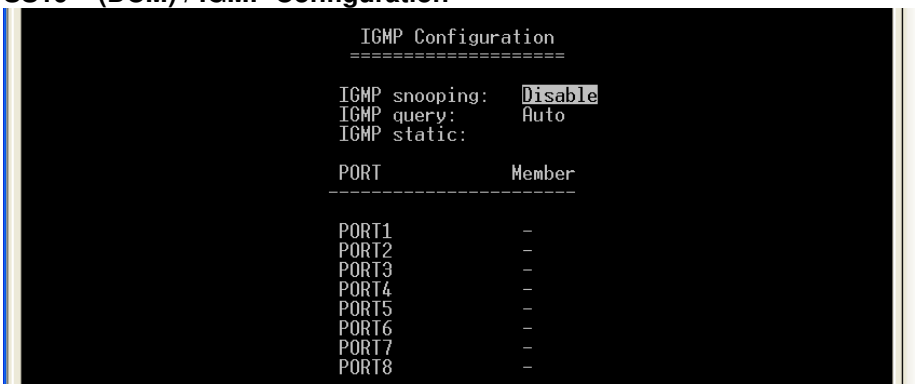
SS18 – (DCM) / Trunk Configuration

Use the usual keys to configure up to four trunk groups.

(DCM) / IGMP Configuration

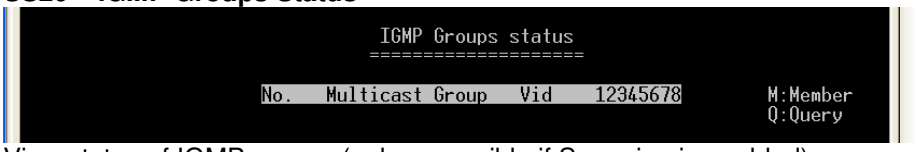
Select this menu and select between Configuration and Group Status:

SS19 – (DCM) / IGMP Configuration



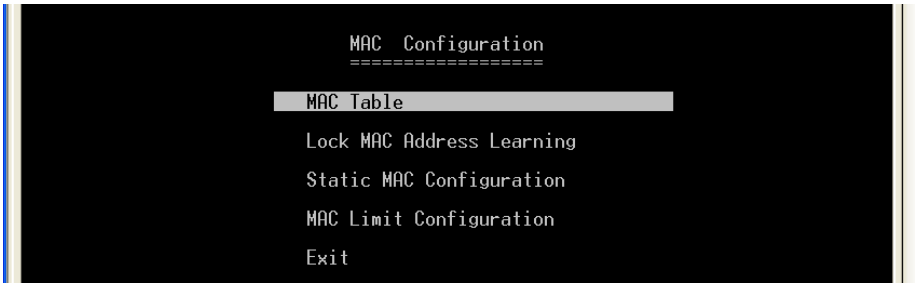
Select between IGMP Snooping (Disable / Enable), IGMP Query (Auto, Enable, Disable) and IGMP static per port (Y / _)

SS20 – IGMP Groups Status



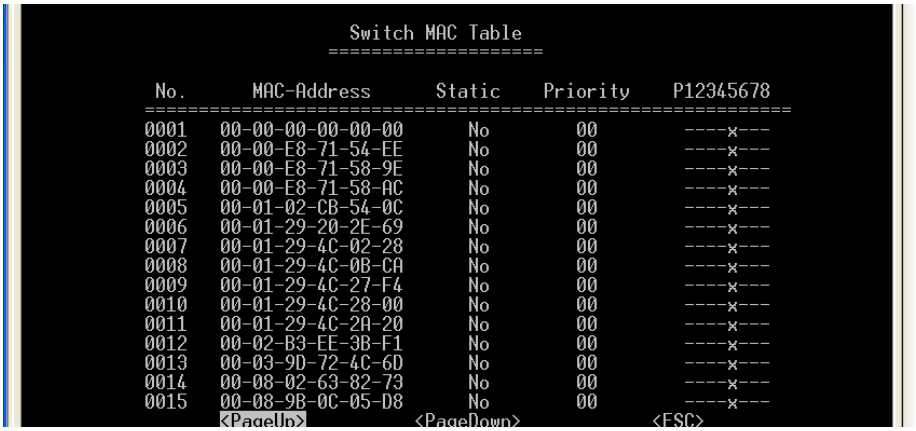
View status of IGMP groups (only accessible if Snooping is enabled)

SS21 – (DCM) / MAC Configuration:



Select field to configure.

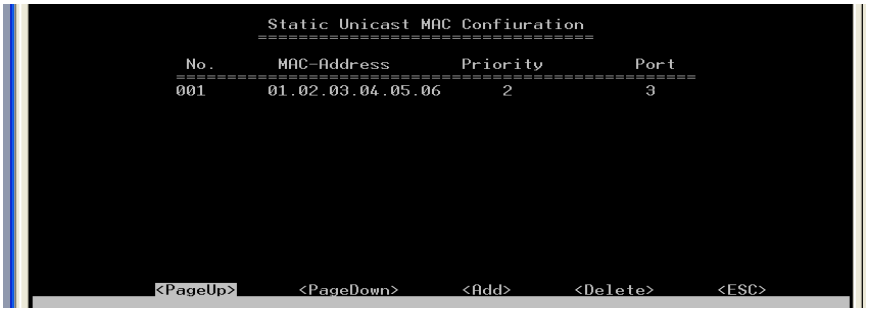
SS22 – MAC Table



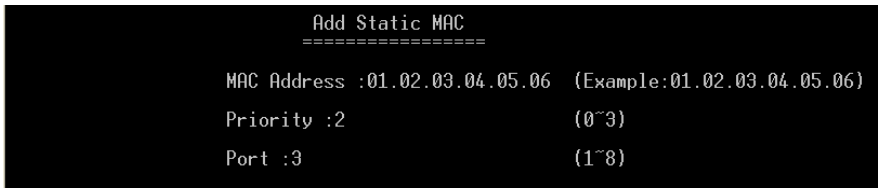
View MAC address information.

Lock MAC Address Learning: Select if you want to put this lock on a port (choose Y / _ per port).

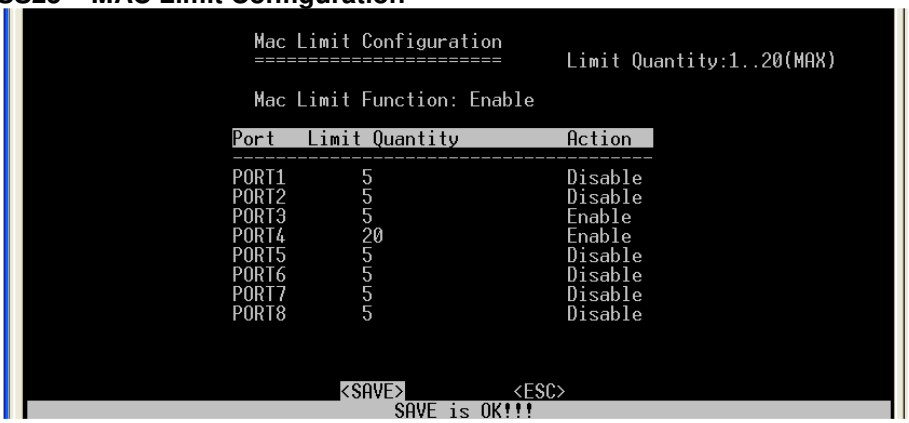
SS23 – Static MAC Configuration:



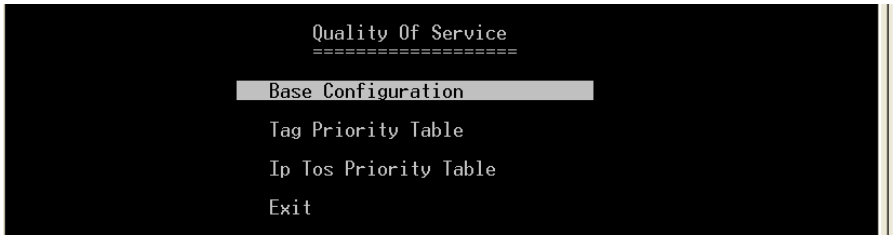
SS24 – Add Static MAC: (Appears when you select Add in previous window.) When cursor is on ESC, pressing Enter will give extra options: Add/SC – press Tab key twice to get ESC.



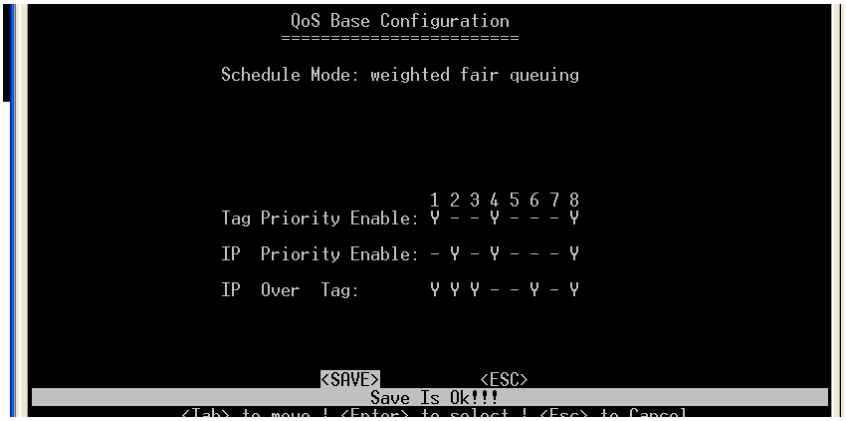
SS25 – MAC Limit Configuration



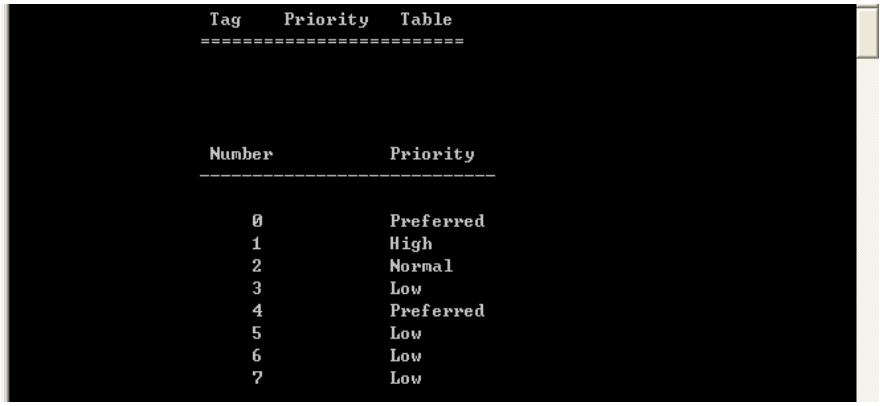
SS26 – (DCM) / Quality of Service



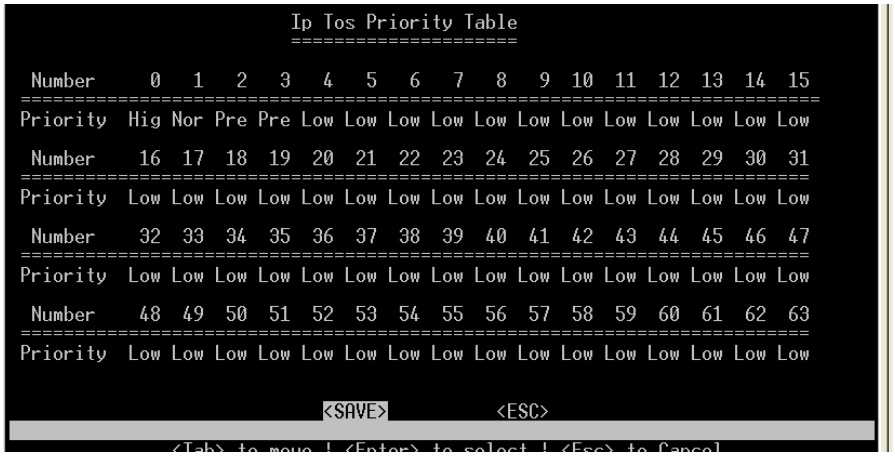
SS27 – QoS Base Config. (weighted fair queuing OR all high before low)


QoS Base Configuration
Schedule Mode: weighted fair queuing
1 2 3 4 5 6 7 8
Tag Priority Enable: Y - - Y - - - Y
IP Priority Enable: - Y - Y - - - Y
IP Over Tag: Y Y Y - - Y - Y
<SAVE>
<ESC>
Save Is Ok!!!

SS28 – (DCM) / QOS / Tag Priority Table



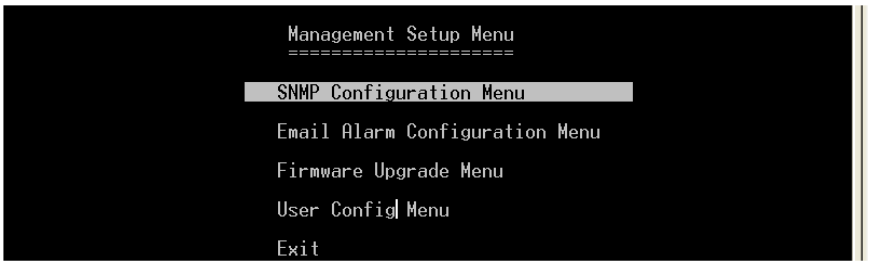
SS29 IP ToS Priority Table


Ip Tos Priority Table
Number 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Priority Hig Nor Pre Pre Low Low Low Low Low Low Low Low Low Low Low Low
Number 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Priority Low Low Low Low Low Low Low Low Low Low Low Low Low Low Low Low
Number 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
Priority Low Low Low Low Low Low Low Low Low Low Low Low Low Low Low Low
Number 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
Priority Low Low Low Low Low Low Low Low Low Low Low Low Low Low Low Low
<SAVE>
<ESC>

Management Setup Menu (MSM)

After logging into the system, you can use this menu to configure the settings for remote access via SNMP agent and to configure the e-mail alarm or to upgrade the firmware. The user should set the community string that controls access to the onboard SNMP agent via in-band management software (SNMP Configuration). The items provided by the Management Setup Menu are described in the following sections.

SS30 – Management Setup Menu (MSM)



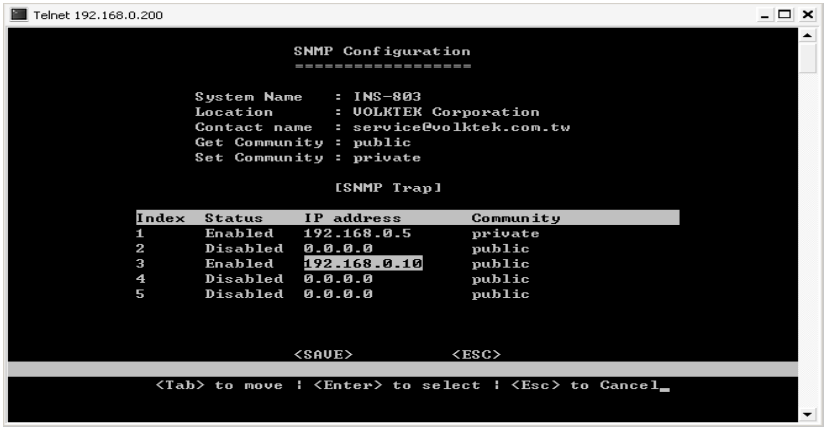
Use the <**Tab**> key to move from one field to the next and the <**Enter**> key to select.

(MSM) / SNMP Configuration Menu

Use the SNMP Configuration screen to display and modify parameters for the Simple Network Management Protocol (SNMP). The Switch

features an onboard SNMP agent that monitors the status of its hardware as well as the traffic passing through its ports. A computer attached to the network, called a Network Management Station (NMS), can be used to access this information. Community strings control access rights to the agent module. To communicate with the switch, the NMS must first submit a valid community string for authentication. The options for configuring community strings and related trap functions are described in the following figures and tables.

SS31 – (MSM) / SNMP Configurations



Use the <**Tab**> and <**Enter**> keys as previously. Enter the IP addresses of computers that will be notified when abnormalities on a connection occur and an alarm needs to be sent. Enter their community names and disable or enable their alarm function.

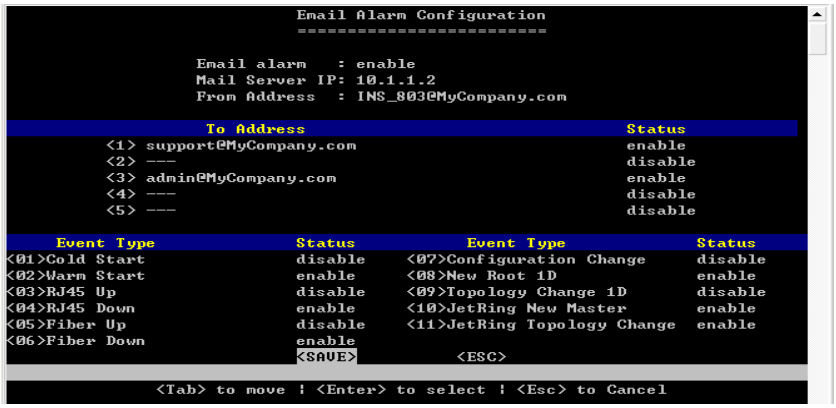
Parameter	Description
Index	Number assigned to each trap
Status	Disable or enable the alarm function
IP Address	Enter the IP addresses of computers that will be notified when abnormalities on a connection occur and an alarm needs to be sent. Enter their community names and disable or enable their alarm function.
Community	Enter their community names

You can use an external SNMP-based application to configure and manage the Switch. This management method requires the SNMP agent on the Switch and the SNMP Network Management Station to use the

same community string. This management method, in fact, uses two community strings: the GET community string and the SET community string. If the SNMP Network Management Station only knows the SET community string, it can read and write to the MIBs. However, if it only knows the GET community string, it can only read MIBs. **The default GET and SET community string for the Switch is 'public'.**

SS32 – (MSM) / E-mail Alarm Configuration

The INS-803 instantaneously issues e-mail warnings to engineers when an exception occurs. Users can also connect a relay output to the Switch's terminal block to enable an audio alarm alert (please see hardware configurations for detail).

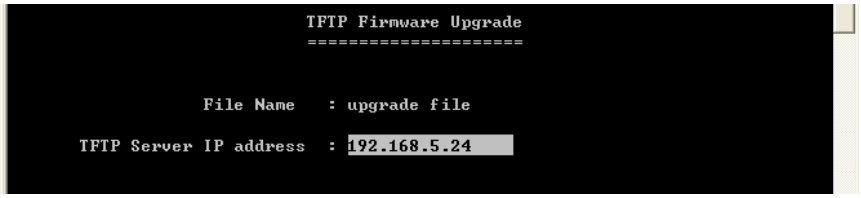


Use the <**Tab**> and <**Enter**> keys as previously. The user must Enable the E-mail Alarm function and provide the valid IP address of the mail server which the Switch will use and a valid e-mail address for the Switch. The user can select up to five (5) e-mail addresses that error messages will be e-mailed to. Provide the valid address and "**Enable**" the status. The user must then select which exceptions will trigger an e-mail alert.

Parameter	Description
E-mail Alarm	Enable / Disable
Mail Server IP	Provide valid IP address of Mail Server
From Address	Assign an e-mail address to the Switch (E.g. INS-803@xxxxxx)
To Address	Provide the e-mail address(es) to which e-mail alarms should be sent. Remember to enable their statuses.
Event Type	Enable the events for which you want to receive an e-mail alert.

SS33 – (MSM) / Firmware Upgrade Menu

The firmware for the INS-803 can also be upgraded via TFTP if such a file has been prepared. Create a TFTP server and upload into it the new firmware file that will be downloaded. This feature helps users to keep updating the firmware with new/enhanced features. For example:



Use the <Tab> to move up and down the menu, and the <Enter> key to select and unselect, or <ESC> to cancel.
Choose the following operations from the menu system:

Parameter	Description
File Name	Enter a file name for new firmware
IP address	Enter IP address of a TFTP server.
Start Upgrade	Select to upgrade firmware

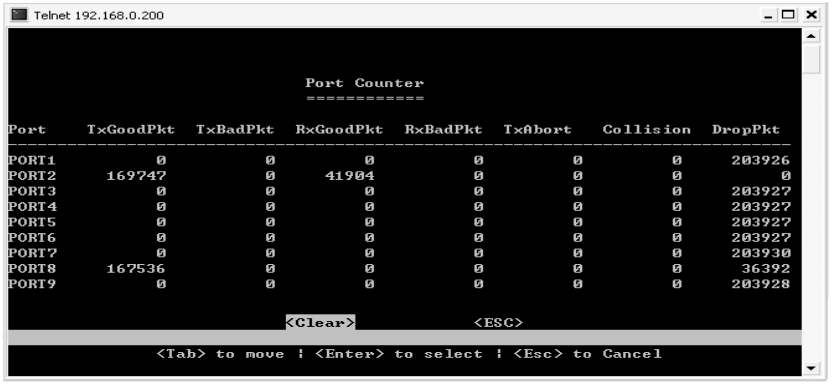
The Switch will download the file and restart to affect the new settings.

SS34 – (MSM) / User Configuration Menu

User Configuration
Index User Name Password User-Level
1 admin xxxxxxxxxxxxxx Read/Write
2 guest1 xxxxxxxxxxxxxx Read Only
3 guest2 xxxxxxxxxxxxxx Read/Write
4 guest3 xxxxxxxxxxxxxx Read Only
5 guest4 xxxxxxxxxxxxxx Read Only

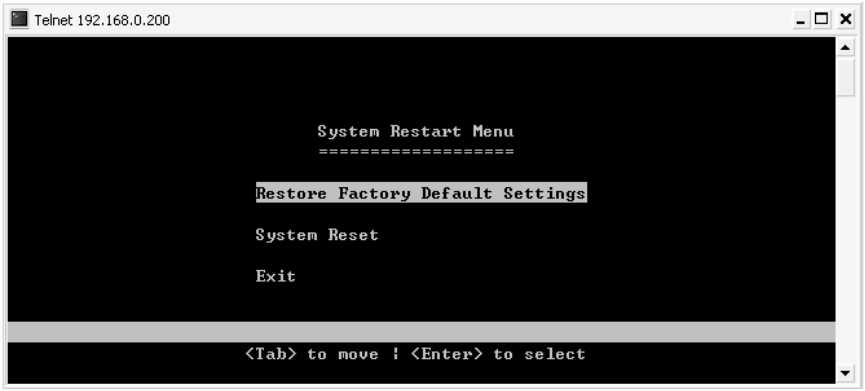
SS35 – Main Menu / Port Counter Menu

The user can view the port's statistics from this screen.


Telnet 192.168.0.200
Port Counter
Port TxGoodPkt TxBadPkt RxGoodPkt RxBadPkt TxAbort Collision DropPkt
PORT1 0 0 0 0 0 0 203926
PORT2 169747 0 41904 0 0 0 0
PORT3 0 0 0 0 0 0 203927
PORT4 0 0 0 0 0 0 203927
PORT5 0 0 0 0 0 0 203927
PORT6 0 0 0 0 0 0 203927
PORT7 0 0 0 0 0 0 203930
PORT8 167536 0 0 0 0 0 36392
PORT9 0 0 0 0 0 0 203928
<Clear>
<ESC>
<Tab> to move ; <Enter> to select ; <Esc> to Cancel

Parameter	Description
Port	Port Number
TxGoodPkt	Good packets transmitted by the port
TxBadPkt	Bad packets transmitted by the port
RxGoodPkt	Good packets received by the port
RxBadPkt	Bad packets received by the port
TxAbort	Transmission aborted by/from the port
Collision	Packet collision information
DropPkt	Number of packets dropped by the port

SS36 – Main Menu / **System Restart Menu:** Users can remotely restart the Switch or reset the Switch to factory default settings via software without turning OFF the power. *WARNING:* IF YOU HIGHLIGHT EITHER 'RESTORE FACTORY SETTINGS' OR 'SYSTEM RESET' AND PRESS ENTER, THE RESET WILL COMMENCE IMMEDIATELY!



Use the <**Tab**> to move up and down the menu, and the <**Enter**> key to select. Choose the following operations from the menu system:

Parameter	Description
System Restore Factory Default Settings	⚠ Pressing Enter when on the Restore field will set the switch back to factory defaults **IMMEDIATELY**. All saved configurations will be lost.
System Reset	Press Enter when on the Reset field to reboot the switch. After rebooting, it is necessary to log in again
Exit	Exits menu and returns to Main Menu

C – Using the Internet Browser Interface

Overview

This section gives a step-by-step guide to configuring the Switch's management functions. A series of screen shots (SS#) and instructions illustrate the main menu structure and how it works.

Firstly, open a web browser and key in the Switch's IP address – then press Enter. A Web Manager page like this will pop up on your screen:

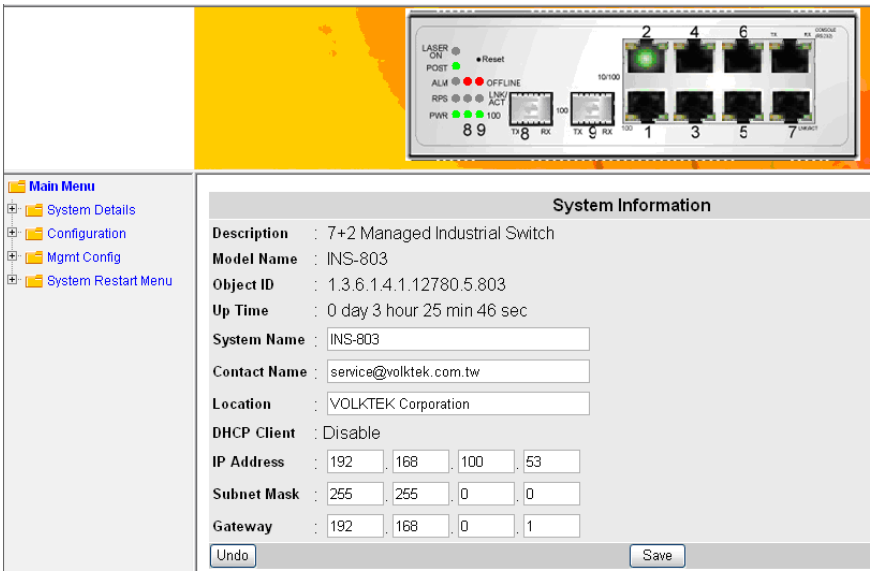
SS1 – Log in

The default username is: **admin**
There is no preset password for this module, so click on **OK** to proceed.

System Details

When your Web browser connects with the Switch's Web agent, the home page is displayed as shown below. The home page displays the Main Menu on the left side of the screen and System Information as the main page. The Main Menu links are used to navigate to other menus and display configuration parameters and statistics.

SS2 – Homepage (System Detail / System Info)


Main Menu
System Details
Configuration
Mgmt Config
System Restart Menu
System Information
Description : 7+2 Managed Industrial Switch
Model Name : INS-803
Object ID : 1.3.6.1.4.1.12780.5.803
Up Time : 0 day 3 hour 25 min 46 sec
System Name : INS-803
Contact Name : service@volktek.com.tw
Location : VOLKTEK Corporation
DHCP Client : Disable
IP Address : 192 . 168 . 100 . 53
Subnet Mask : 255 . 255 . 0 . 0
Gateway : 192 . 168 . 0 . 1
Undo
Save

Click on each parameter field to modify the specific settings, click **Undo** to restore previously saved configurations or click **Save** to retain newly entered information. See description below:

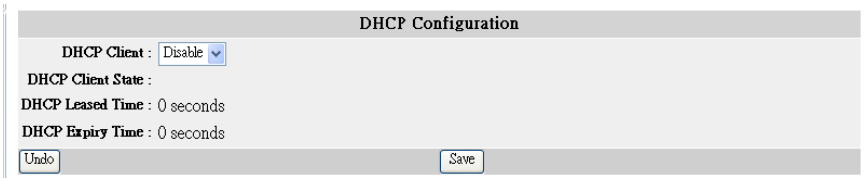
Parameter	Description
Description	Provides description of the Switch
Object ID	ID or Serial number
Up Time	Provides information on up time, or the time that the system has been operating
System Name Contact	Modify the name of the Switch here Enter a contact name
Location	Enter the location of Switch
DHCP Client	Disabled or client's name
IP Address	Default: 192.168.100.1
Subnet Mask	Default: 255.255.0.0
Gateway	Default: 192.168.0.1

NOTE:
1, *The above are factory defaults used as an example only. A new address is important. Choose numbers between 0 and 254 in each sub-address field. Make a note of them and keep the details in a safe place.*

SS3 – Board Info

Parameter	Description
Hardware Version	Provides information on the hardware version
Firmware Version	Provides information on the firmware version
Port Number	Provides information on the number of ports available

SS4 – DHCP Configuration

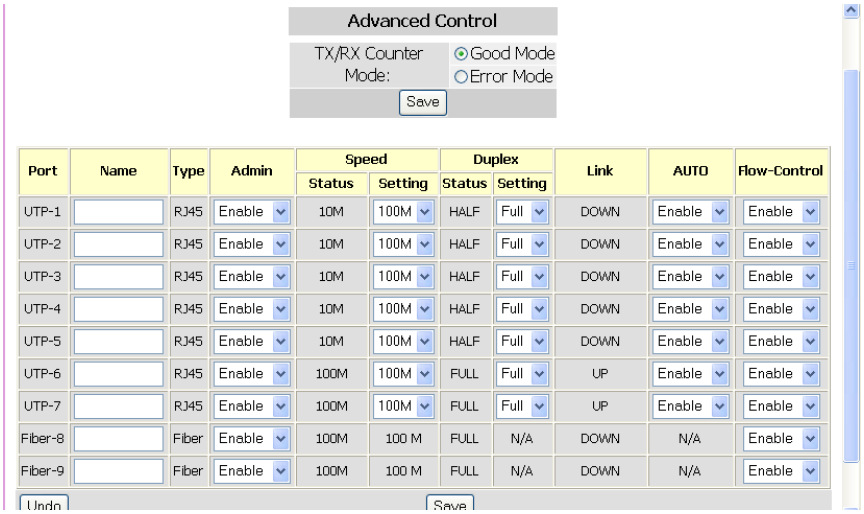


Configuration

Port Configuration

This section allows you to view and change the parameter settings for the individual ports on the Switch. See screen shot and table below for adjustable parameters.

SS5 – Config. / Port Configuration


Advanced Control
TX/RX Counter Mode:
Good Mode
Error Mode
Save
Port
Name
Type
Admin
Speed
Status
Setting
Duplex
Status
Setting
Link
AUTO
Flow-Control
UTP-1 RJ45 Enable 10M 100M HALF Full DOWN Enable Enable
UTP-2 RJ45 Enable 10M 100M HALF Full DOWN Enable Enable
UTP-3 RJ45 Enable 10M 100M HALF Full DOWN Enable Enable
UTP-4 RJ45 Enable 10M 100M HALF Full DOWN Enable Enable
UTP-5 RJ45 Enable 10M 100M HALF Full DOWN Enable Enable
UTP-6 RJ45 Enable 100M 100M FULL Full UP Enable Enable
UTP-7 RJ45 Enable 100M 100M FULL Full UP Enable Enable
Fiber-8 Fiber Enable 100M 100 M FULL N/A DOWN N/A Enable
Fiber-9 Fiber Enable 100M 100 M FULL N/A DOWN N/A Enable
Undo
Save

Click on each parameter field to modify the desired setting, then click on **Undo** to restore previously saved configurations or click on **Save** to retain newly entered information. See description below:

Parameter	Description
Advanced Controls	Activates TX/RX Counter Mode
Good Mode	Registers the number of good packets
Error Mode	Registers the number of error, collided, or bad packets
Port	Port types and numbers
Name	Assign a names to each port to keep record of your connections
Type	Type of connector for each port (auto-detects fiber and RJ-45)
Admin	Enable or disable admin configurations
Speed: Status	Provides information on speed at which ports are currently operating
Speed: Setting	Set speed for RJ-45 ports. (The speed for fiber ports is fixed)
Duplex: Status	Provides information on Duplex Status
Duplex: Setting	Select half / full duplex modes
Link	Provides information on link status
Auto	Enable / Disable Auto-negotiation on copper ports
Flow Control	Enable / Disable flow control for each port

NOTE: *Disable the Auto (Auto-negotiation) function to configure Speed and Duplex.* Click on **Undo** to restore previously saved configurations or click on **Save** to retain newly entered information.

SS6 - Port Status

Ports Status

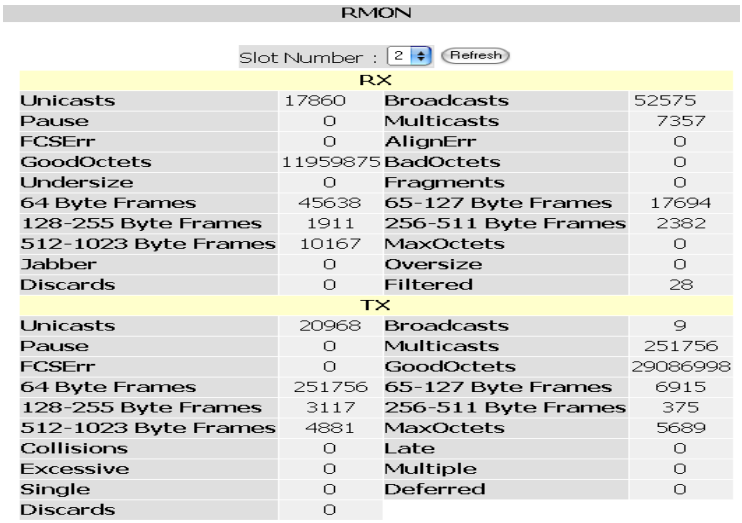
Port	Name	Type	Admin	Speed	Duplex	Link	Auto	Flow Control	Rx-Counter	Tx-Counter
UTP-1		RJ45	Enabled	10M	HALF	DOWN	ON	Enabled	0	0
UTP-2		RJ45	Enabled	10M	HALF	DOWN	ON	Enabled	0	0
UTP-3		RJ45	Enabled	10M	HALF	DOWN	ON	Enabled	0	0
UTP-4		RJ45	Enabled	10M	HALF	DOWN	ON	Enabled	0	0
UTP-5		RJ45	Enabled	10M	HALF	DOWN	ON	Enabled	0	0
UTP-6		RJ45	Enabled	100M	FULL	UP	ON	Enabled	60624	34394
UTP-7		RJ45	Enabled	100M	FULL	UP	ON	Enabled	46654	4621
Fiber-8		Fiber	Enabled	100M	FULL	DOWN	N/A	Enabled	0	17809
Fiber-9		Fiber	Enabled	100M	FULL	DOWN	N/A	Enabled	0	0

Port Configuration

This window offers at-a-glance status reporting for Switch operations. Click on the Port Configurations button to return to the Port Configurations window if you need to change a setting.

SS7 – RMON Status

The user can view the details of packet transmission and reception at each port. Select the port number (1 ~ 9) to see the port details.



RX			
Unicasts	17860	Broadcasts	52575
Pause	0	Multicasts	7357
FCSErr	0	AlignErr	0
GoodOctets	11959875	BadOctets	0
Undersize	0	Fragments	0
64 Byte Frames	45638	65-127 Byte Frames	17694
128-255 Byte Frames	1911	256-511 Byte Frames	2382
512-1023 Byte Frames	10167	MaxOctets	0
Jabber	0	Oversize	0
Discards	0	Filtered	28
TX			
Unicasts	20968	Broadcasts	9
Pause	0	Multicasts	251756
FCSErr	0	GoodOctets	29086998
64 Byte Frames	251756	65-127 Byte Frames	6915
128-255 Byte Frames	3117	256-511 Byte Frames	375
512-1023 Byte Frames	4881	MaxOctets	5689
Collisions	0	Late	0
Excessive	0	Multiple	0
Single	0	Deferred	0
Discards	0		

Bridge Menu

Using the Bridge Menu

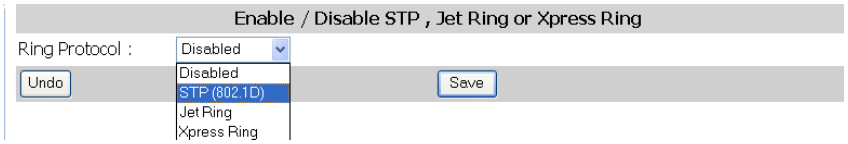
The Bridge menu is used for configuring the Jet Ring, Spanning Tree Algorithm and Xpress Ring settings, as well as the traffic class priority threshold and the address aging time.

The Jet Ring offers fast recovery time of less than 300ms in case of link failure (if Jet Ring is enabled). It has a longer recovery time than Xpress Ring (50ms), but it needs almost no set-up configuration.

Xpress Ring offers a very fast link-failure recovery time of 50ms, but the user must select the role of the Switch (arbiter or forward) and which two ports will be part of the Xpress Ring network.

The Spanning Tree Algorithm is used for detecting and disabling network loops, and to provide backup links between switches, bridges or routers. This allows the switch to communicate and interact with other bridging devices (i.e. STA-compliant devices) in a network to ensure that only one route exists between any two stations, and it provides redundant or backup links that automatically take over when a primary link goes down.

SS8 - Bridge Configuration

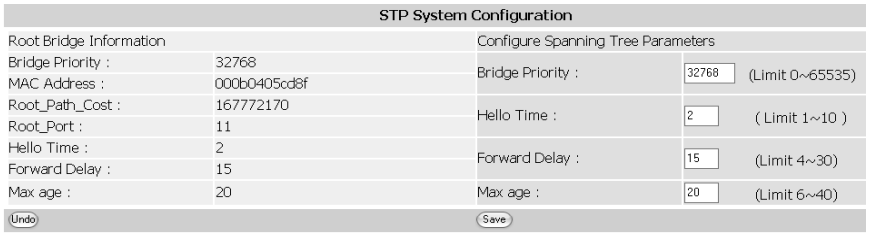


Parameter	Description
Disabled	Disable redundancy function
STP (802.1D)	Redundant link via Spanning Tree Protocol
Jet Ring	Redundant link with fast recovery time of less than 300ms
Xpress Ring	Redundant link with fastest recovery time: less than 50ms

Select the appropriate mode as per the network needs, then click on **Save** to retain newly entered information or click on **Undo** to restore previously saved configurations.

SS9 – (Bridge) / STP System Configuration

This screen allows the user to enter the STP parameters for the Switch. Please note: users must select "**STP 802.1D**" under Bridge Configuration to perform this configuration. Otherwise, this option will not be accessible.

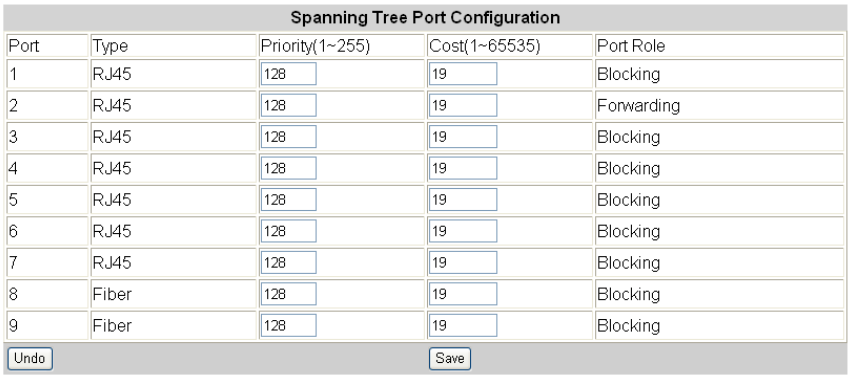

STP System Configuration
Root Bridge Information
Bridge Priority : 32768
MAC Address : 000b0405cd8f
Root_Path_Cost : 167772170
Root_Port : 11
Hello Time : 2
Forward Delay : 15
Max age : 20
Configure Spanning Tree Parameters
Bridge Priority : 32768 (Limit 0~65535)
Hello Time : 2 (Limit 1~10)
Forward Delay : 15 (Limit 4~30)
Max age : 20 (Limit 6~40)
Undo
Save

Enter the appropriate entries, then click on **Save** to retain newly entered information or click on **Undo** to restore previously saved configurations.

Parameter	Description
Bridge Priority	Set the bridge priority. The limit is given between 0 (the highest priority) and 65535 (the lowest priority). Bridge priority is used in selecting the root device, root port, and designated port. The device with the highest priority becomes the STA root device. However, if all devices have the same priority, the device with the lowest MAC address will then become the root device.
Hello Time	Time interval (in seconds) at which the root device transmits a configuration message. The limit given is from 1 – 10 seconds.
Max. age	Set the (maximum age) waiting time for receiving packets before attempting to reconfigure the link. The limit given is from 6 – 40 seconds.
Forward Delay	Set Forward Delay. The limit given is from 4~30 seconds. This is the maximum time (in seconds) the root device will wait before changing states (i.e., listening to learning to forwarding).

SS10 – (Bridge) / STP Per-Port Configuration

STP allows the Switch to assign a priority status to each of its ports, with respect to other networking nodes in the network. In other words, STP determines the best route for data to flow, given the priority level of each node on the network. Ensure that this function is activated to avoid collisions and when setting up backup links.

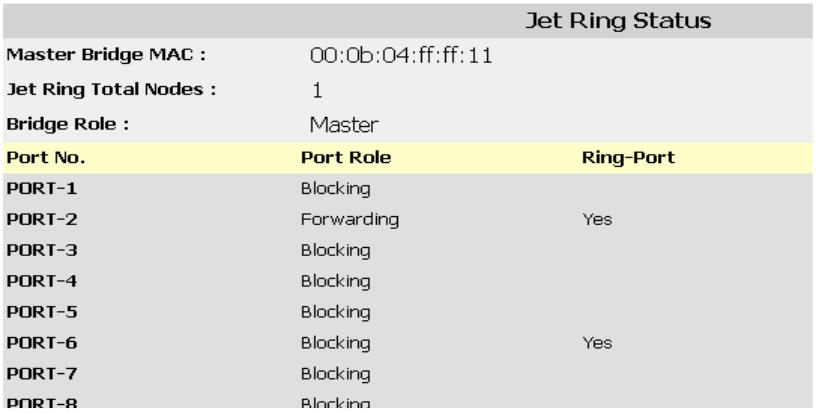


Click on each parameter field to modify the desired setting, then click on **Undo** to restore previously saved configurations or click on **Save** to retain newly entered information. See description below:

Parameter	Description
Port Type	RJ45: Ethernet port Fiber: Fiber port
Port Priority	Set the priority of each port. The limit given is from 1 – 255. The lowest number means highest priority. The default priority is set to 128 – the midpoint of this limit
Cost	Set the cost assigned to each port. This will determine the route of information flow. The higher the cost the less suitable the port is to be a node for the STP.
Port Role	Blocking: the port is blocking by Spanning Tree Protocol Forwarding: the port is forwarding

SS11 – (Bridge) / Jet Ring Status

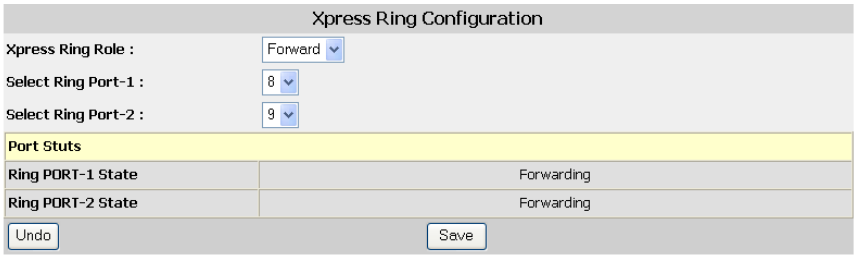
Users can view the Jet Ring status after enabling the Jet Ring at the "**Bridge Configuration**" menu.



Jet Ring Status		
Master Bridge MAC :	00:0b:04:ff:ff:11	
Jet Ring Total Nodes :	1	
Bridge Role :	Master	
Port No.	Port Role	Ring-Port
PORT-1	Blocking	
PORT-2	Forwarding	Yes
PORT-3	Blocking	
PORT-4	Blocking	
PORT-5	Blocking	
PORT-6	Blocking	Yes
PORT-7	Blocking	
PORT-8	Blocking	

Parameter	Description
Master Bridge MAC Address	Display MAC address of the Switch in the Jet Ring
Jet Ring Total nodes	Number of Switches forming a Jet Ring
Bridge Role	The role of the Switch
Port Role	Display each port's role
Ring Port	Display which ports are ring ports

SS12 – (Bridge) / Xpress Ring Configuration



Here you must set the Switch's role in the Xpress Ring network and the ports that will be part of the Xpress Ring. If the network's configuration changes (e.g. for a node failure or added switch) the MIS personnel has to make sure these settings are still valid – if the ring is set for XPress Ring.

Xpress Ring Role: Arbiter – the Switch which receives status reports submitted from other Switches of the ring and decides the ring recovery behaviors

Forward – the Switch which is not the Arbiter of the ring and will forward the received status reports on the other side of ring ports

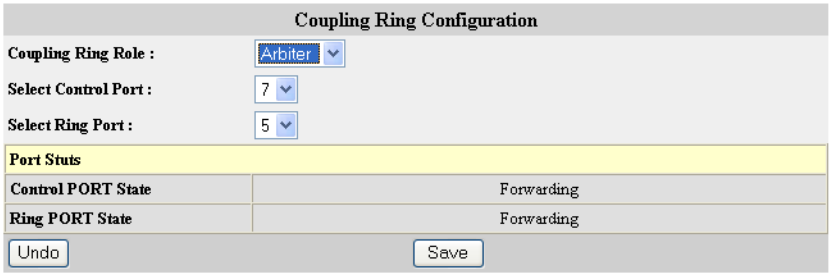
Select Ring Port-1: the first ring port with the link composing part of the Xpress Ring

Select Ring Port-2: the second port with the link composing part of the Xpress Ring

Port status: display the ring port statuses as "Forwarding" for packet transmitting and receiving status, or "Blocking" for port disabled or link down status

Coupling Ring

Set Coupling Ring configurations to all Switches of either side of two interconnected Xpress Rings.



- Coupling Ring Role: Arbiter – the Switch with the backup secondary link to the peer Xpress Ring.

  Master – the Switch with the primary link to the peer Xpress Ring.

  Normal – the Switches not with the links connecting to peer Xpress Ring.
- Select Control Port: the Control Port of Coupling Ring Master Switch or Arbiter Switch for communication with each other.
- Select Ring Port: the Ring Port of Coupling Ring Master Switch or Arbiter Switch for connection to the peer coupled Xpress Ring
- Port status: display the port status of Control Port or Ring Port as "Forwarding" for packet transmitting and receiving status, or "Blocking" for port disabled or link down status

Virtual Local Area Networks (VLAN)

A VLAN is a network of computers behaving as though they are connected to the same segment, even though their physical location may be on a different segment of a LAN altogether. VLANs are configured through software rather than hardware, which makes them extremely flexible.

Some of the advantages of VLANs are:

- When a computer is physically moved to another location, it can stay on the same VLAN without any hardware reconfiguration because VLANs are not limited by hardware constraints.

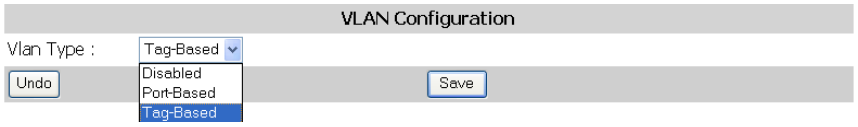
- VLANs can be configured to define a network into various logical configurations. For example, VLANs can define a network by application. In this scenario, a company might create one VLAN for multimedia users and another for e-mail users.

- VLANs can also define a network by department. For example, a company might have one VLAN for its Engineering Department, another for its Marketing Department, and another for its Sales Department.

- VLANs can also be set up according to the organization's internal structure. For example, the company president might have his/her own VLAN, the executive staff might have a different VLAN, and the remaining employees might have yet a different VLAN.

As these examples show, VLANs offer incomparable flexibility. The following section describes how VLANs can be deployed using the Switch.

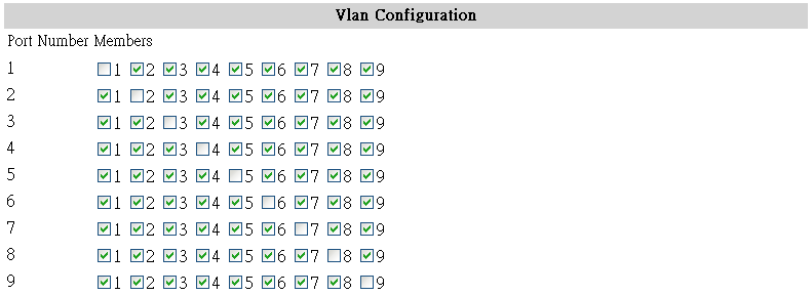
SS13 – VLAN Type / (VLAN Configuration)



The “Vlan Type” menu let users select the VLAN type of the Switch.

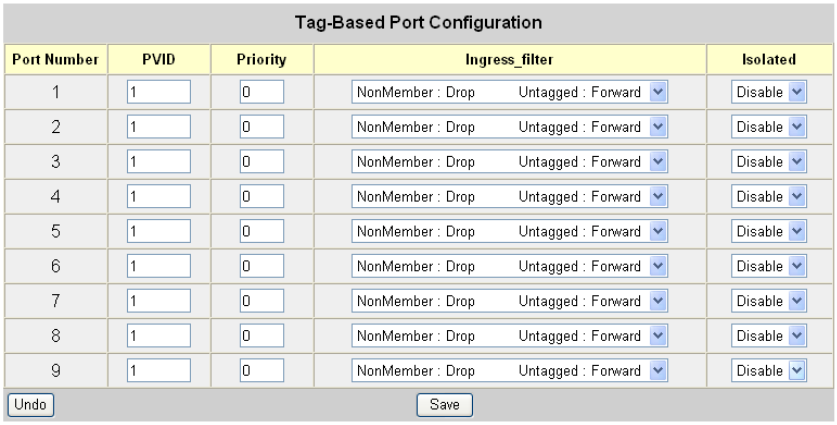
Parameter	Description
Disabled	The VLAN function is disabled.
Port-based	The VLAN function is enabled for Port-based VLANs.
Tag-based	The VLAN function is enabled for IEEE802.1Q VLANs

SS14 – Port-based VLAN Configuration:



The Menu “Port-based” is for configuration of Port-based VLAN. It is enabled only when the VLAN Type is set as “Port-based”.
At each port the user must click on the checkboxes of the ports to which the port is allowed to switch frames from the configured port. And then click on **Save** to retain newly entered information or click on **Undo** to restore previously saved configurations.

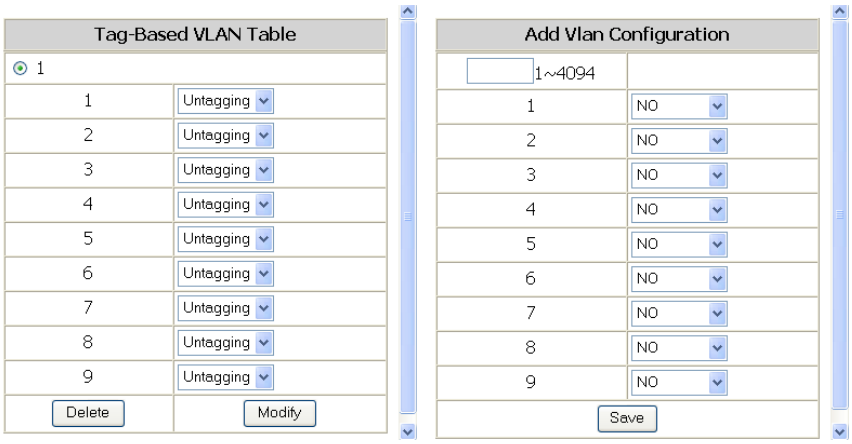
SS15 – Tag-based VLAN port config. (Tagging Base / Port Info)


Tag-Based Port Configuration
Port Number
PVID
Priority
Ingress_filter
Isolated
1 1 0 NonMember : Drop Untagged : Forward Disable
2 1 0 NonMember : Drop Untagged : Forward Disable
3 1 0 NonMember : Drop Untagged : Forward Disable
4 1 0 NonMember : Drop Untagged : Forward Disable
5 1 0 NonMember : Drop Untagged : Forward Disable
6 1 0 NonMember : Drop Untagged : Forward Disable
7 1 0 NonMember : Drop Untagged : Forward Disable
8 1 0 NonMember : Drop Untagged : Forward Disable
9 1 0 NonMember : Drop Untagged : Forward Disable
Undo
Save

The menu “Tag-based” is for configuration of Tag-based VLAN. It is enabled only when the VLAN Type is set as “Tag-based”. The sub-menu “Port Info” let users configure the way in which each port treats the incoming frames that are marked for Tag-based VLANs.

Parameter	Description
PVID	Set the VLAN ID. The limit is 1 to 4095. The VLAN ID is assigned to all untagged frames received on this port.
Priority	Set VLAN Priority. The limit given is between 0 – 7. 0 is the lowest priority and 7 is the highest priority.
Ingress Filter 1 (Non-Member) and Filter 2 (Untagged)	● Non-Member (1): Forward Untagged (2): Forward Forward the VLAN-tagged frames that are not members of any VLAN in which the port is participating, and forward all untagged frames. ● Non-Member (1): Drop Untagged (2): Forward Drop the VLAN-tagged frames which are not members of any VLAN of which the port is participating, and forward all untagged frames. ● Non-Member (1): Drop Untagged (2): Drop Drop the VLAN-tagged frames which are not members of any VLAN of which the port is participating, and drop all untagged frames.
Isolated	Enable – The port is isolated. Isolated ports belonging to the same VLAN do not communicate with each other – this is generally set for security reasons. The isolated ports communicate only with the trunk ports, which should NOT be set as “isolated”. Disable – The port is not isolated and can communicate with all ports of the VLANs.

SS16 – "Tag-based info" menu:



The sub-menu "Tag-based info" let users add, modify, or delete entries in the Tagging VLAN Table, the configurations of 802.1Q VLANs and the participating ports. Up to 64 VLANs can be configured on the Switch.

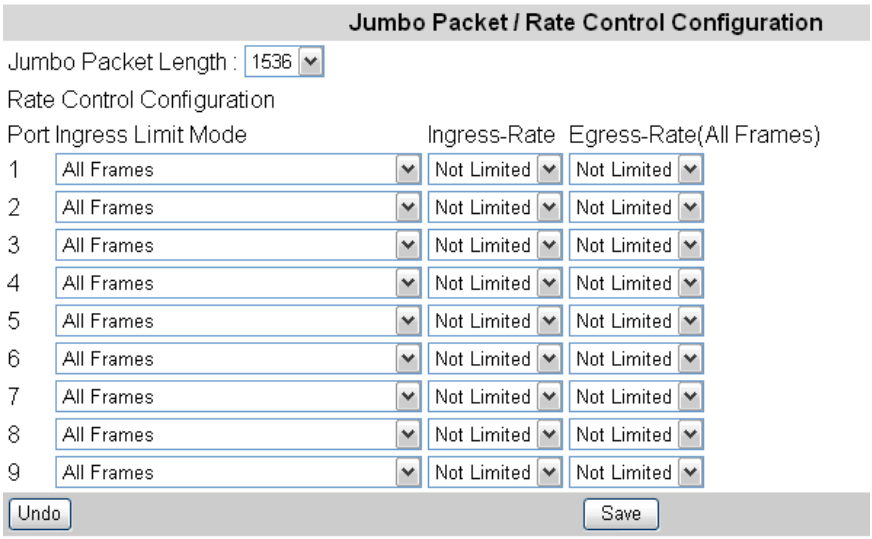
On the left is the Tag-based VLAN Table, where existing VLANs can be modified or deleted. In the first row is the VLAN ID (VID) numbers (1, 2, etc.) of the previously configured VLANs. Users can click on a VID number to display the port information of that VLAN. The following table describes the port parameters in regard to 802.1Q VLANs:

Parameter	Description
No	The port is not participating in the VLAN as identified by the selected VID (VLAN ID).
Untag	The port is an untagging port (as defined in 802.1Q) that is participating in the VLAN. In such an untagged port the Switch will strip off the 802.1Q tag from the incoming and outgoing frames if they are tagged in such a way. This is used for sending frames to non-802.1Q-compliant devices.
Tag	The port is a tagging port (as defined in 802.1Q) and is participating in the VLAN. The Switch will put the VLAN information of the port – including VID and Priority – into the header of the untagged frames coming in or transmitted from the port. The tagged VLAN information in the frames can later be used by other 802.1Q-compliant devices for forwarding decisions.

Click the “Modify” button to modify configurations of the selected VLAN according to the settings on the table.
Click the “Delete” button to delete the VLAN entries of the selected VID.

On the left is the “Add VLAN Configuration” work area where you can add VLAN configuration entries onto the Tagging VLAN Table. Enter a valid configurable 802.1Q VID ranging from 1 ~ 4094 into the field on the first row. Next, specify for each port the parameters described in the table above – this will decide if the specific port will participate in that specific VID and how it will participate. Click the “Save” button to add the new VLAN to the Tagging VLAN Table.

SS17 - Packet Configuration
Use this screen to set the Jumbo packet limit and the Rate Control for each port of the Switch.


Jumbo Packet / Rate Control Configuration
Jumbo Packet Length : 1536
Rate Control Configuration
Port Ingress Limit Mode
Ingress-Rate
Egress-Rate(All Frames)
1 All Frames Not Limited Not Limited
2 All Frames Not Limited Not Limited
3 All Frames Not Limited Not Limited
4 All Frames Not Limited Not Limited
5 All Frames Not Limited Not Limited
6 All Frames Not Limited Not Limited
7 All Frames Not Limited Not Limited
8 All Frames Not Limited Not Limited
9 All Frames Not Limited Not Limited
Undo
Save

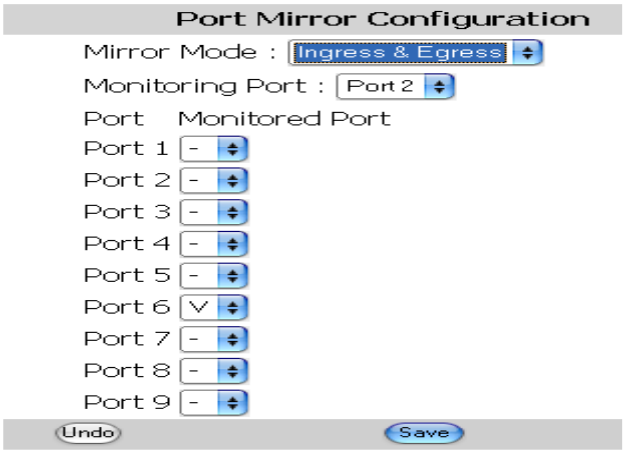
Click on each parameter field to modify the desired setting, then click on **Save** to retain newly entered information or click on **Undo** to restore previously saved configurations.

Parameters described below:

Parameter	Description
Jumbo Packet Length	Select the size of packets: 1536 – For double-tagged packets or jumbo packets 1522 – For normally tagged packet. 1518 bytes are actually allowed for untagged packets.
Port Ingress Limit Mode	Select to block the specified traffic from the port.
Multicast Rate Limit	All Frames: – Restrict all kinds of packets (Default) exceeding the rate set in the Ingress/Egress Rate fields Multicast/Broadcast & Flooded unicast: – Restrict these packets when exceeding the set value Multicast/Broadcast only: – Restrict these packets when exceeding the assigned value Broadcast only: – Restrict broadcast only packets when exceeding the assigned limit
Ingress / Egress Rate	Set the threshold of traffic of limited packets for each port in the Switch

SS18 – Port Mirror

Set the port mirroring option to monitor data being transmitted through a specific port.

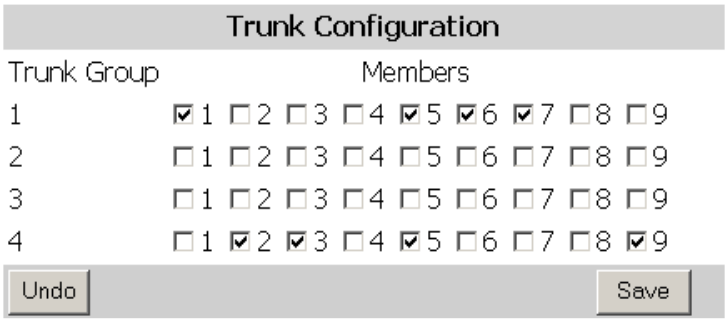


Click on each parameter field to modify the desired setting, then click on **Save** to retain newly entered information or click on **Undo** to restore previously saved configurations.

Parameter	Description
Mirror Mode	Select appropriate mode Disable: – Mirror mode is disabled Ingress & Egress: – Monitor both incoming and outgoing traffic Egress: – Monitor only outgoing traffic
Monitoring Port	Select the port which will do the monitoring
Monitored Port	Select the port that needs to be monitored

SS19 – Trunk Configuration

Port Trunking defines a network link aggregation and trunking method which specifies how to create a single high-speed logical link that combines several low-speed physical links. Use the Trunk Configuration page shown below to create trunk groups. The Switch supports a maximum of four trunk groups. Each trunk group may be comprised of up to four ports, selected from any combination of ports 1~8.



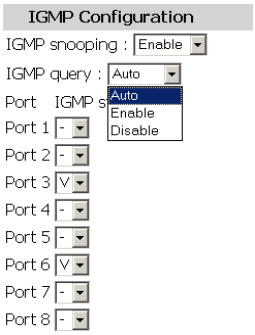
IGMP Menu – Using the IGMP Menu:

The IGMP menu is used for configuring IGMP snooping. IGMP means "Internet Group Management Protocol". It is a protocol through which hosts can register with their local router for multicast services. If there is more than one multicast router on a given sub-network, one of the routers is elected and assumes the responsibility of keeping track of group membership.

SS20 – IGMP Configuration

This menu allows the user to Enable/Disable IGMP Snooping and IGMP Query.

Note: In order to keep the switch traffic efficient, the last byte of the IP address should not be the same as in the IGMP group. E.g. if the Switch's IP address is 192.168.0.10 and the IGMP router / switch's IP address is 192.168.21.10, this will make the switch less efficient.



SS21 – IGMP Group Status

This window will display the IGMP group status of the port members if IGMP traffic is present.

IGMP Groups Status

No.	Multicast Group	vid	1	2	3	4	5	6	7	8	9

The MAC Menu

The MAC menu will enable the following configurations:

SS22 – MAC Table Status

The user can view the MAC Table by selecting this function.

MAC Table Status

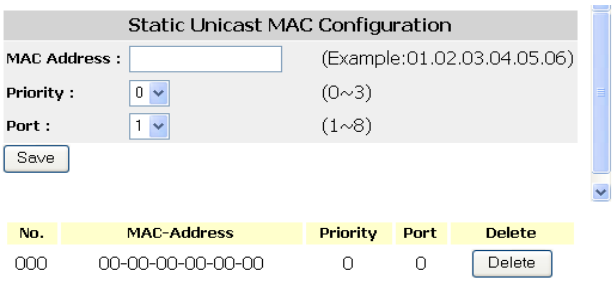
No.	MAC-Address	Static	Priority	1	2	3	4	5	6	7	8	9
0001	00-04-7E-01-03-A4	Yes	02	-	-	-	-	-	X	-	-	-
0002	00-09-3D-00-52-EE	No	00	-	-	-	-	-	-	-	X	-
0003	00-0B-04-05-7E-9D	No	00	-	-	-	-	-	-	-	X	-
0004	00-0B-06-00-00-14	No	00	-	-	-	-	-	-	-	X	-
0005	00-0F-EA-71-2E-C1	No	00	-	-	-	-	-	-	-	X	-
0006	00-40-01-20-3A-8D	No	00	-	-	-	-	-	-	-	X	-
0007	00-40-01-43-24-68	No	00	-	-	-	-	-	-	-	X	-
0008	00-40-01-80-AB-C6	No	00	-	-	-	-	-	-	-	X	-
0009	00-40-F4-54-D2-B8	No	00	-	-	-	-	-	-	-	X	-

SS23 – Lock Learning MAC

The user can stop specific port(s) from learning MAC addresses. Select the port(s) that need to be locked so that they cannot learn MAC addresses.

SS24 – Static MAC Configuration

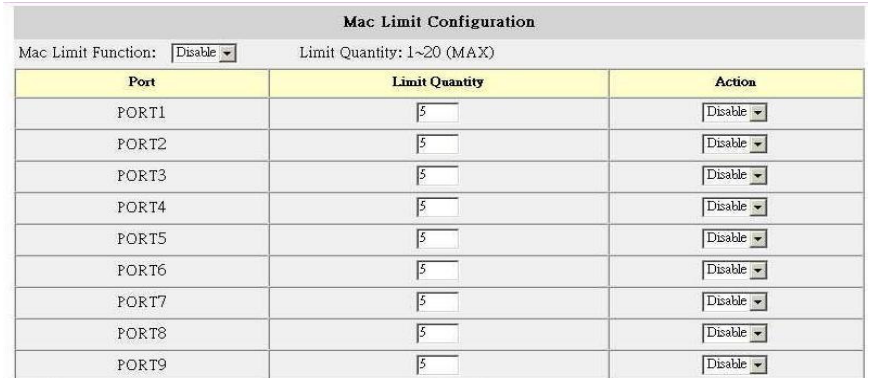
Here the user can select a static MAC configuration for certain port(s) of the Switch.



Add the valid MAC address in the MAC field, then select the priority and port number. Press “Save” to implement the input.

The Static MAC addresses and their settings will be displayed in the table below the input bar. Press “Delete” to void the configuration.

SS25 – MAC Limit Configuration:



The "MAC Limit Configuration" menu let the user limit the number of incoming MAC addresses per port. If the user wants to disable this function, select "Disable" from the combo box "Mac Limit Function" on the upper left. The Limit Quantity range is 1~20 per port. The MAC addresses learned are recorded on a per-port basis. Only the frames with such recorded MAC addresses will be forwarded. This learning process will be conducted every three minutes. So, if users change the NIC of the PC or IP appliance, the new MAC address will be learned in three minutes by the Switch, with the set quantity limitations. The MAC Limit Function can be disabled or enabled per port, under the parameter labeled "Action" in the table. Generally this function is only enabled for downlink ports.

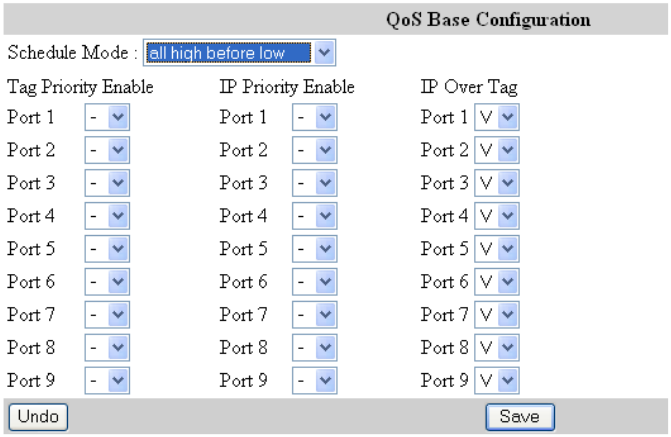
QoS Menu

QoS (Quality of Service) refers to the mechanisms in the Switch's network software that make the actual determinations of which packets have priority. The Switch supports advanced QoS features like scheduling, classification and policing.

SS26 – QoS Base Configuration

This window offers user to perform the **basic** configuration for Quality of Service.

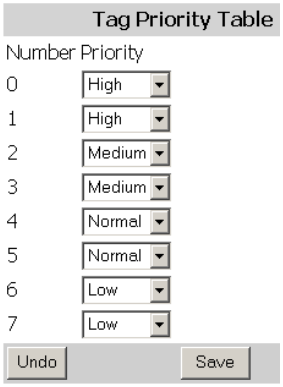
Schedule Mode: weighted fair queuing / all high before low



Weighted Fair Queuing (WFQ) is a packet-scheduling technique allowing guaranteed bandwidth services. The purpose of WFQ is to let several sessions share the same link.
Once you adjusted the basic settings, use the “Save” button to implement these changes.

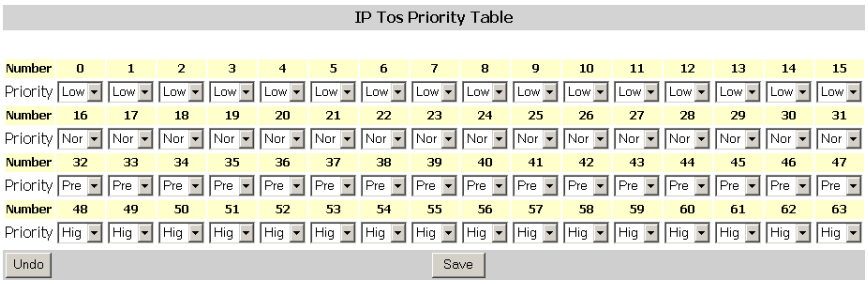
SS27 – Tag Priority

The user can define up to eight different priority values for the Tagged VLAN frames. Select the priority queue number for the Switch to map the MAC frames into different priority queues: i.e. High, Medium, Normal or Low. Use <**Save**> to apply the settings.



SS28 – IP ToS Priority

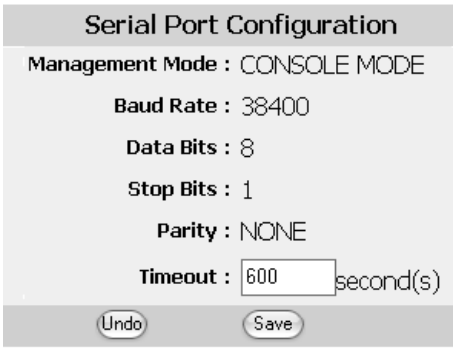
The IP ToS (Type of Service) Priority menu provides up to 63 different priorities. The user can select the most suitable combination.


IP Tos Priority Table
Number 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Priority Low Low Low Low Low Low Low Low Low Low Low Low Low Low Low Low
Number 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Priority Nor Nor Nor Nor Nor Nor Nor Nor Nor Nor Nor Nor Nor Nor Nor Nor
Number 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
Priority Pre Pre Pre Pre Pre Pre Pre Pre Pre Pre Pre Pre Pre Pre Pre Pre
Number 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
Priority Hig Hig Hig Hig Hig Hig Hig Hig Hig Hig Hig Hig Hig Hig Hig Hig
Undo
Save

Management Configurations

SS29 – Serial Port Configuration

Here the user can see the serial port configuration that can be utilized while accessing the switch via Console port.

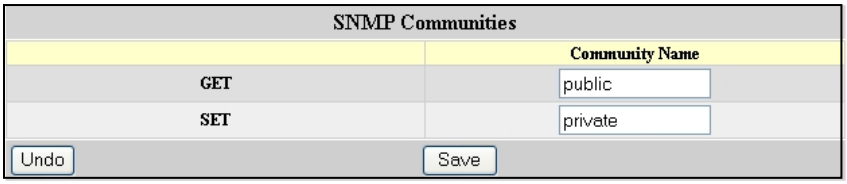


Click on each parameter field to modify the desired setting, then click on **Save** to retain newly entered information or click on **Undo** to restore previously saved configurations.

Parameter	Description
Management Mode, Baud Rate, Data Bits, Stop bits, Parity	Default COM port properties
Time Out	Set the time (seconds) for auto-logout in case there is no activity for that time period

SNMP Configurations

SS30 - SNMP Communities



Click on each parameter field to modify the desired setting, then click on **Save** to retain newly entered information or click on **Undo** to restore previously saved configurations.

Parameter	Description
GET	Community Name (public) - for reference only
SET	Community Name (private) - a group that can be renamed, e.g. individuals that have access to this management program
Community Names	Modify the Community names

NOTE:
You can use an external SNMP-based application to configure and manage the switch. This management method requires the SNMP agent on the switch and the SNMP Network Management Station to use the same community string. This management method, in fact, uses two community strings: the GET community string and the SET community string. If the SNMP network management station only knows the SET community string, it can read and write to the MIBs (**M**anagement **I**nformation **B**ases of the devices), but, if it only knows the GET community string, it can only read the MIBs.

The default GET and SET community strings for the switch is 'public'.

SS31 - IP Trap Manager

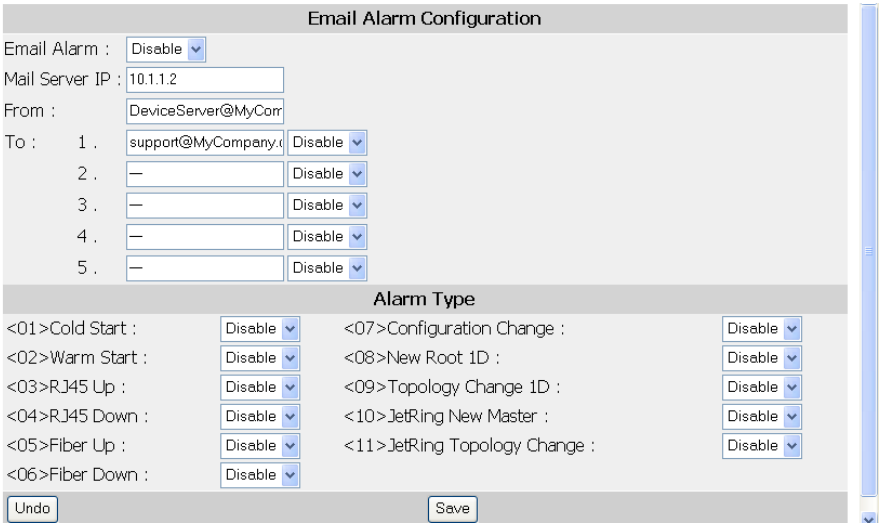
The following tables describe how to specify the management stations that will receive authentication failure messages or other trap messages from the switch. Up to 5 trap managers may be assigned.

Click on each parameter field to modify the desired setting, then click on **Save** to retain newly entered information or click on **Undo** to restore previously saved configurations.

Parameter	Description
IP Address	Enter the IP address of terminals for when abnormalities on a connection occur and an alarm needs to be sent. The alarm will be sent to these terminals. Enter their community names and disable or enable their alarm function accordingly
Community Name	Enter their community names
Status	Disable or enable their alarm functions

SS32 – E-mail Alarm Configuration

The INS-803 can send alarm notifications via e-mail to assigned e-mail addresses in case of any abnormal event. Up to 5 e-mail addresses can be assigned.



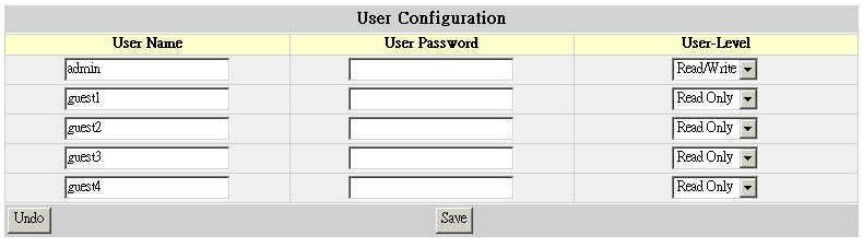
Click on each parameter field to modify the desired setting, then click on **Save** to retain newly entered information or click on **Undo** to restore previously saved configurations.

Parameter	Description
E-mail Alarm	Enable / Disable e-mail alarm notification (Default = Disable)
Mail Server IP	Enter the IP address of the mail server
From	Valid e-mail address assigned to the Switch
To	E-mail address(es) to which e-mail will be sent (maximum of 5)
Alarm Type	Enable / Disable the type of event that should trigger an e-mail alarm

SS33 – <u>User Configuration</u>

If this is your first time to log into the configuration program, then the default user name is “admin” with no password. The “user level” access allows configuration to all parameters and statistics.

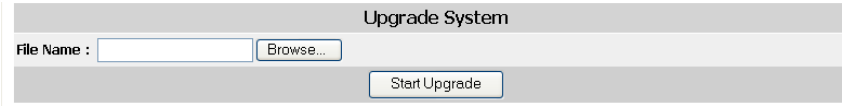
You should define a new administrator password, record it and put it in a safe place. Select User Configuration from the Management Setup Menu and enter a user name and/or password for the administrator. Note that passwords can consist of up to 12 and the username up to 20 alphanumeric characters – and they are not case sensitive.



Five users can be configured by the Switch.
Click on each parameter field to modify the desired setting, then click on **Save** to retain newly entered information or click on **Undo** to restore previously saved configurations.

Parameter	Description
User Name	Modify the default Username
Password	Modify the User Password
User Level	Read/Write: – Users with the user level "Read/Write" have administrator privileges and can look at AND change the configurations of the Switch. Read Only: – The users with the user level "Read Only" can only look at the configurations of the Switch.

SS34 - Firmware Download (Upgrade System)
Use the HTTP Download menu to load software updates into the permanent flash ROM in the switch. The download file should be in a binary format. Otherwise, the agent will not accept it. The success of the download operation depends on the quality of the network connection. After downloading the new software, the agent will automatically restart itself. See the following figure and table:

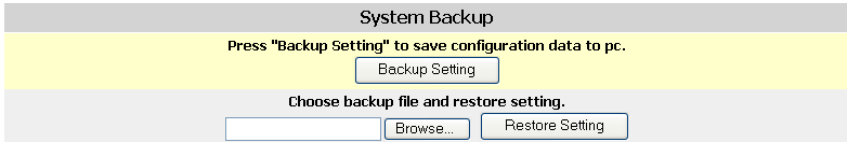


Click on “**Browse**” to select the firmware file. Once the selection is made, click “**Start Upgrade**” to upgrade the systems. The Switch will restart once the new firmware is uploaded.

Parameter	Description
File Name	Use the Browse function to find and select the firmware to be uploaded
Start Upgrade	Click here to upgrade firmware

SS35 – Configuration File (System Backup)

The INS-803 enables the user to get a back-up of the configuration file. This will help the user to install many VOLKTEK switches with the same configurations.

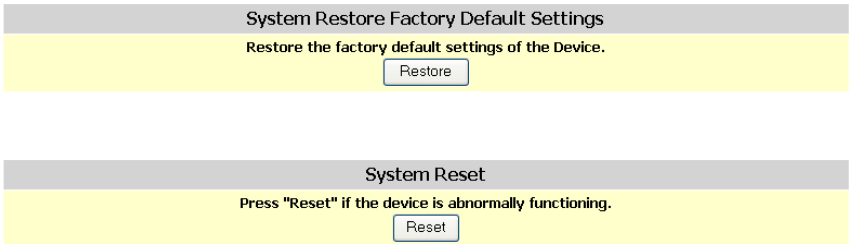


Backup settings:
Click the “Backup Setting” button and a download window for “**Config.bin**” will appear. Save the file in a safe location for later retrieval.

Restore settings:
Click on “Browse” button to select the downloaded/backed-up configuration file, and then press the “**Restore Setting**” button. The Switch will restart and apply the settings as in the configuration file.

Parameter	Description
System Backup	Use this menu to make a backup of the Switch’s configurations. To begin, click on the backup setting button. Then follow the prompts to save the Switch’s configurations to a designated terminal
Restore Settings	Use this menu to retrieve saved files. Click the browse function to select the correct file. Then click “Restore Settings”.

SS36 – Restart Option


System Restore Factory Default Settings
Restore the factory default settings of the Device.
Restore
System Reset
Press "Reset" if the device is abnormally functioning.
Reset

Click one of these buttons to reset / restart the system without turning OFF the power. WARNING: RESET WILL HAPPEN IMMEDIATELY!!!

Parameter	Description
System Restore Factory Default Settings	⚠ Clicking on the Restore button will set the switch back to factory defaults. **WARNING: All saved configurations will be lost**
System Reset	Click on the Reset button to reboot the switch. After rebooting, it is necessary to log in again

D – Command Line Interface via Telnet / Console port

This section provides some basic instructions for using CLI to configure the Switch. Follow the instructions below:

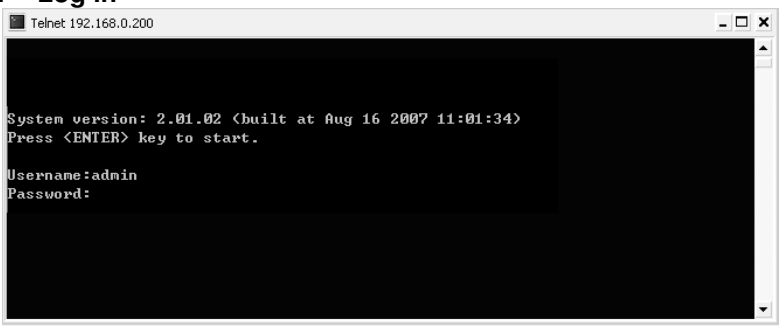
1. Open a Command Prompt window and type

   telnet xxx.xxx.xxx.xxx where the xxx's represent the IP address.

   As an example, we'll first use the IP address configured in part A of this manual: 192.168.0.190. The later screenshots are of a different IP address.

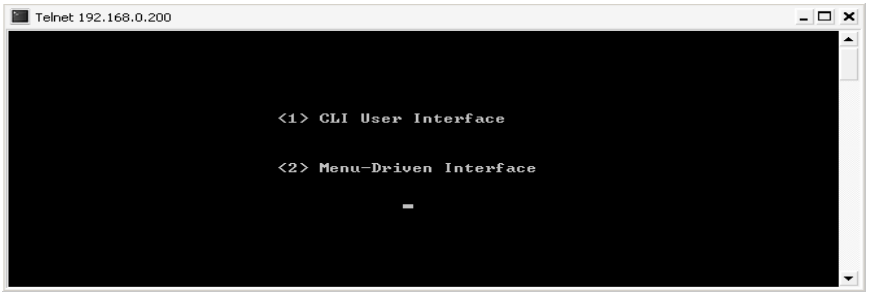
2. Then "**Press <ENTER> key to start**"

SS1 – Log in



3. The default log-in name is "admin" with no preset password. The system provides both CLI and menu-driven user interfaces via console or telnet. After you log into the system, you will see a welcome message as below:

SS2 – Welcome

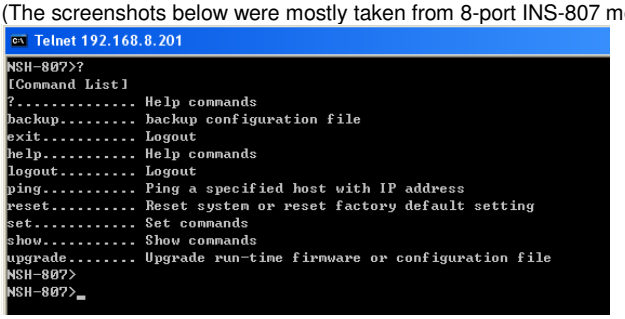


4. Type 1 to select CLI operations

At this point, type in '?' or 'help' followed by Enter to display a full list of help commands with explanations of their functions.

SS3 – Help commands

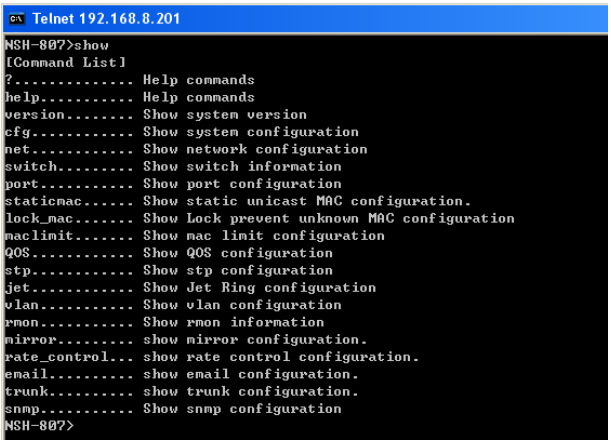
(The screenshots below were mostly taken from 8-port INS-807 models)



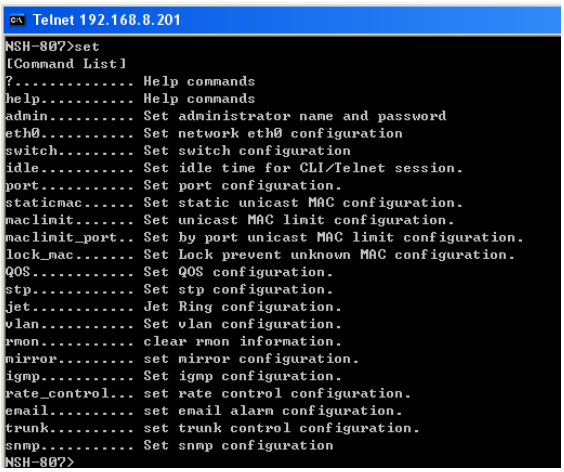
The table above lists and explains all the configuration commands. Users can refer to the table when configuring the Switch management agent. Where appropriate, a status report can be shown by typing 'show' followed by the parameter name.

Type 'show' and press Enter to display a full list of configuration commands:

SS4 - Show commands



SS5- System configurations


Telnet 192.168.8.201
NSH-807>set
[Command List]
?.............. Help commands
help........... Help commands
admin.......... Set administrator name and password
eth0........... Set network eth0 configuration
switch......... Set switch configuration
idle........... Set idle time for CLI/Telnet session.
port........... Set port configuration.
staticmac...... Set static unicast MAC configuration.
maclimit....... Set unicast MAC limit configuration.
maclimit_port.. Set by port unicast MAC limit configuration.
lock_mac....... Set Lock prevent unknown MAC configuration.
QOS............ Set QOS configuration.
stp............ Set stp configuration.
jet............ Jet Ring configuration.
vlan........... Set vlan configuration.
rmon........... clear rmon information.
mirror......... set mirror configuration.
igmp........... Set igmp configuration.
rate_control... set rate control configuration.
email.......... set email alarm configuration.
trunk.......... set trunk control configuration.
snmp........... Set snmp configuration
NSH-807>

Enter the command line and follow the argument list. Be sure to put a space between the commands. E.g. changing or setting the company name:

set eth0 ip xxx.xxx.xxx.xxx

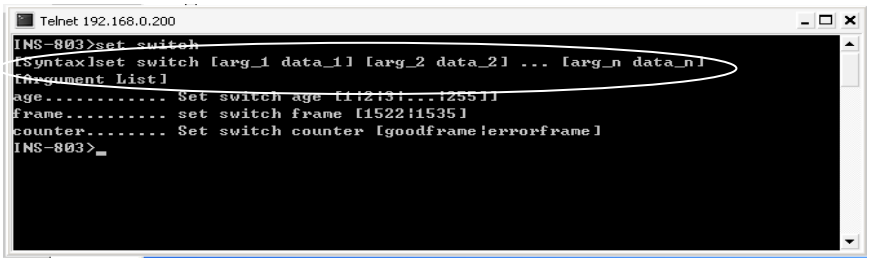
A confirmation note will follow

SS6 – Confirmation Note

By using a similar command line, all the other available system parameters – such as port configuration, SNMP, rate, idle time, etc. can be modified to your own network requirements.

Command	Description
set	• set admin - follow the prompts to change username and password • set eth0 – configure ip (new IP address) network mask (new network mask) gateway (new gateway) Use this command to set new addresses • set switch – set switch parameters like jumbo frame, max age, and counter • set idle (time in seconds) - set automatic logout when the program is idle • set port name - use this command to assign a name to each port • admin – enable / disable • speed – set the speed for each port • duplex – set the duplex mode for each port • autonego – enable / disable auto-negotiation • loopback – enable / disable loopback • mcrate – assign a limit for multicast rate • egress - Switch treatment of RX packets • ingress – port treatment of TX packets • priority – set the priority for each port • ffc – enable / disable Activate Flow control • vid – assign VLAN IDs • set rmon – clear rmon display • set mirror – configure the mirroring port • set snmp – configure snmp and communities

SS7 - Switch configurations



Enter the command line and follow the argument list. Be sure to put a space between the commands. E.g. setting the switch age:

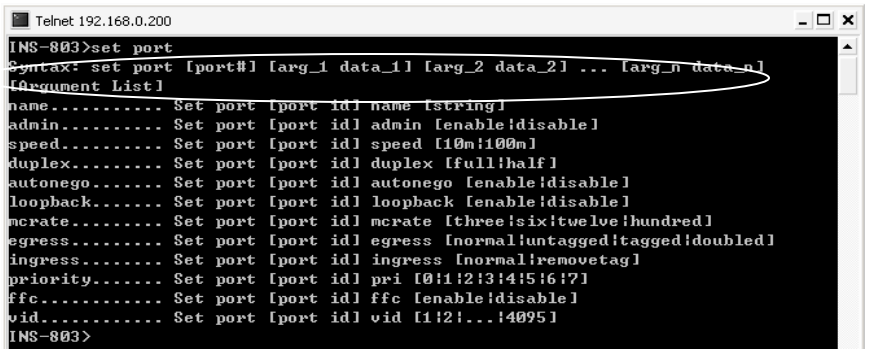
set switch age 1

A confirmation note will follow

NOTE: each switch age unit is equal to 16 seconds. The default is 304 seconds. The limit given is from 1 – 255 units. This is the time-out period in seconds for aging out dynamically learned forwarding information.

By using a similar command line, the other Switch parameters – like frame and counter – can be modified to your own requirements.

SS8 - Port configurations


Telnet 192.168.0.200
INS-803>set port
Syntax: set port [port#] [arg_1 data_1] [arg_2 data_2] ... [arg_n data_n]
[Argument List]
name..... Set port [port id] name [string]
admin..... Set port [port id] admin [enable|disable]
speed..... Set port [port id] speed [10m|100m]
duplex..... Set port [port id] duplex [full|half]
autonego..... Set port [port id] autonego [enable|disable]
loopback..... Set port [port id] loopback [enable|disable]
mcrate..... Set port [port id] mcrate [three|six|twelve|hundred]
egress..... Set port [port id] egress [normal|untagged|tagged|doubled]
ingress..... Set port [port id] ingress [normal|removetag]
priority..... Set port [port id] pri [0|1|2|3|4|5|6|7]
ffc..... Set port [port id] ffc [enable|disable]
vid..... Set port [port id] vid [1|2|...|4095]
INS-803>

Enter the command line and follow the argument list. Be sure to put a space between the commands. E.g. changing or setting the name of port 1:

set port 1 name office

A confirmation notice will follow

By using a similar command line, all the other port parameters such as admin, speed, duplex, autonego, mcrate, etc. can be modified to your requirements.

SS9 & SS10 - Spanning Tree Protocol (STP) configurations

STP allows the Switch to assign a priority status on the Switch with respect to other networking nodes in the network. Ensure that this function is activated when setting up backup links and to avoid collisions.

Enter the command line and follow the argument list. Be sure to put a space between the commands. E.g. changing or setting the STP status:

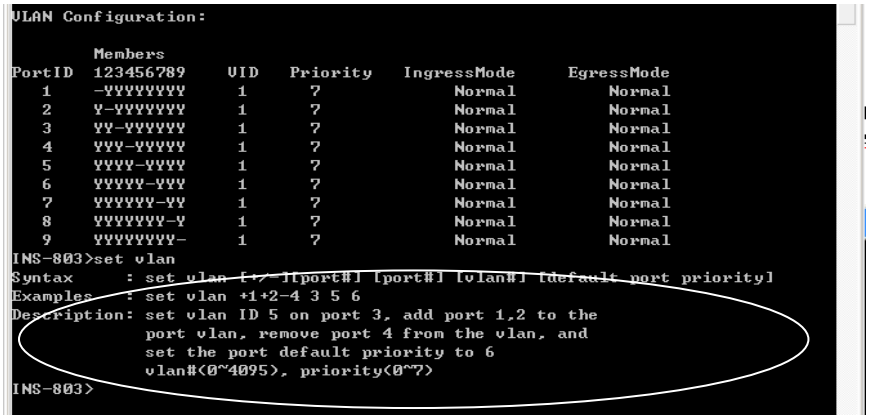
set stp enable

By using a similar command line, all other STP parameters – such as bridge and port can be modified to your own requirements.

SS11 - Virtual LAN configurations

Enter the command line and follow the argument list. Be sure to put a space between the commands. E.g. changing or setting VLANs:

show vlan


VLAN Configuration:
Members
PortID 123456789 VID Priority IngressMode EgressMode
1 -YYYYYYYY 1 7 Normal Normal
2 Y-YYYYYYY 1 7 Normal Normal
3 YY-YYYYYY 1 7 Normal Normal
4 YYY-YYYYY 1 7 Normal Normal
5 YYYY-YYYY 1 7 Normal Normal
6 YYYYY-YYY 1 7 Normal Normal
7 YYYYYY-YY 1 7 Normal Normal
8 YYYYYYY-Y 1 7 Normal Normal
9 YYYYYYYY- 1 7 Normal Normal
INS-803>set vlan
Syntax : set vlan [+/-]tport#] [port#] [vlan#] [default port priority]
Examples : set vlan +1+2-4 3 5 6
Description: set vlan ID 5 on port 3, add port 1,2 to the
port vlan, remove port 4 from the vlan, and
set the port default priority to 6
vlan#(0~4095), priority(0~7)
INS-803>

Enter the command line and follow the argument list. Be sure to put a space between the commands. E.g. changing or setting the VLANs:

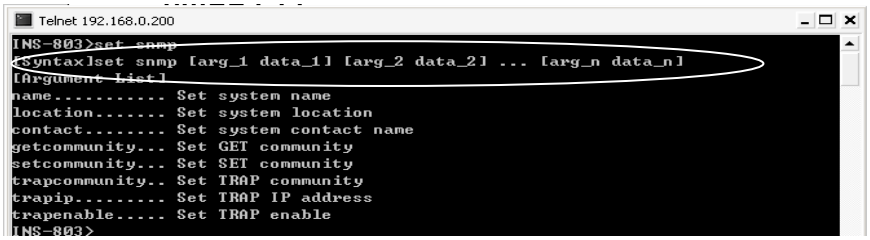
set vlan

Above example given to configure VLANs

Use a similar command line as above to configure VLAN parameters such as members, VID, priority, Ingress mode and Egress mode to your own requirements.

Simple Net Management Protocol (SNMP) configurations using CLI

SS12 - SNMP configurations

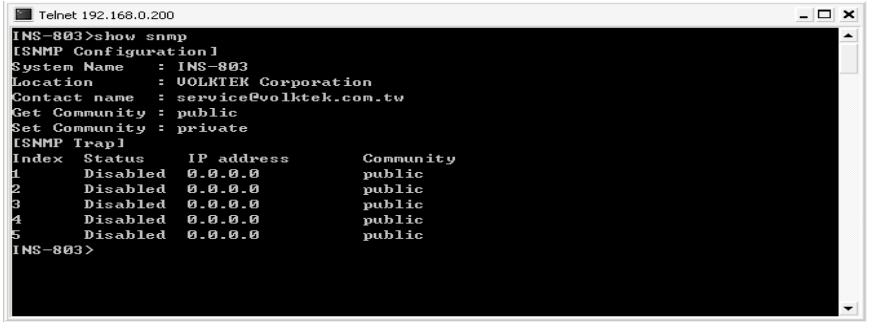


Enter the command line and follow the argument list. Be sure to put a space between the commands. E.g. changing or setting SNMP functions:

set snmp contact service@MyCompany.Com

A message will follow to confirm new settings.

SS13 - Set Trap



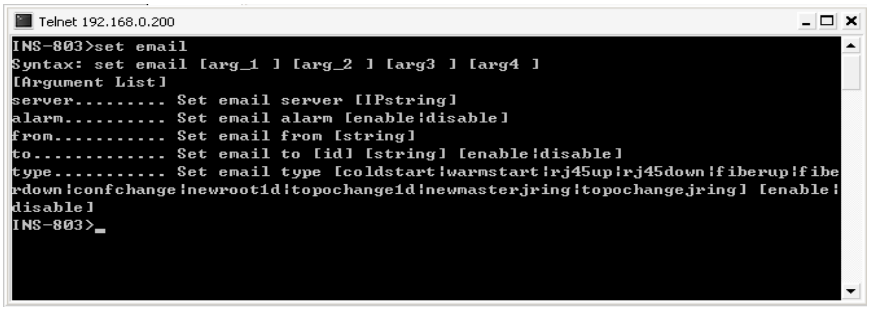
There are five addresses that an alarm can be sent to when abnormalities occur on a connection. To set up this list, use the following example to configure your own list. Type the following command line and press **<ENTER>**:

set snmp trapip 1 xxx.xxx.xxx.xxx
set snmp trapcommunity 1 Bob

Use a similar command line to configure traps 2 - 5
Type **show snmp** to view the list – e.g:

NOTE: *Use Web Browser Interface to enable each trap community*

SS14 - Set e-mail


Telnet 192.168.0.200
INS-803>set email
Syntax: set email [arg_1] [arg_2] [arg3] [arg4]
[Argument List]
server..... Set email server [IPstring]
alarm..... Set email alarm [enable|disable]
from..... Set email from [string]
to..... Set email to [id] [string] [enable|disable]
type..... Set email type [coldstart|warmstart|rj45up|rj45down|fiberup|fiber
down|confchange|newroot1d|topochange1d|newmasterjring|topochangejring] [enable|
disable]
INS-803>

There are five e-mail addresses that an alarm can be sent to when abnormalities occur on a connection. To set up the e-mail list and other parameters, use the following example. Type the following command line and press **<ENTER>**:

set e-mail to 1 admin@MyCompany.com
set e-mail from INS_803@MyCompany.com

NOTE: *Use Web Browser Interface to enable e-mail alarm*

The network administrator can observe and monitor the statuses of most of the Switch's functions by looking at the LED indicators on the front panel. This section contains a few of the more common problems that may arise – and possible solutions.

Symptom: Power indicator does not light up after power on.
Cause: Defective power outlet or power cord.
Solution: Verify if the power outlet is functioning normally by plugging in another properly operating device. Connect the power cord to another device to test. If these two tests fail to find the problem, replace the power supply unit.

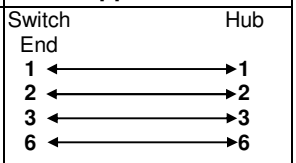
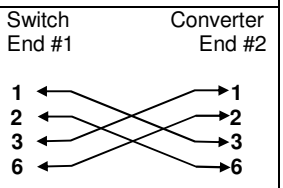
Symptom: Link indicator does not light up after making a connection.
Cause: Network cable or fiber/copper port is defective.
Solution: Ensure that the Switch and the attached device are powered on. Verify that the fiber and/or copper cable has been properly connected to both devices. Check that the cabling distance does not exceed specified limits for the cable type. Inspect cable for defects and replace if necessary.

Symptom: Unit powers off during operation after a period of time.
Cause: Loose power connections, power surges / loss or unavailability of redundant power.
Solution: Ensure that all power connections are secure and that the redundant power is properly attached. If unable to correct the problem by above measures, it may be necessary to replace the internal power-supply unit.

RJ-45 Cables

When connecting your network devices, use a standard Category 3 eight-way cable for a 10Base-T configuration and a Category 5 cable for 100Base-TX. The pin assignments are as follows:

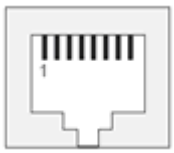
Pin	**1**	**TD+**	**Pair2**	**White/Orange**
Pin	**2**	**TD-**	**Pair2**	**Orange/White**
Pin	**3**	**RX+**	**Pair3**	**White/Green**
Pin	**4**	**N/A**	**Pair1**	**Blue/White**
Pin	**5**	**N/A**	**Pair1**	**White/Blue**
Pin	**6**	**RX-**	**Pair3**	**Green/White**
Pin	**7**	**N/A**	**Pair4**	**Brown/White**
Pin	**8**	**N/A**	**Pair4**	**Brown/White**

Application	Cable Type	Application
Switch to Switch or Network Adapter	Straight-through Cable	
Converter to Switch	Cross-Over Cable	

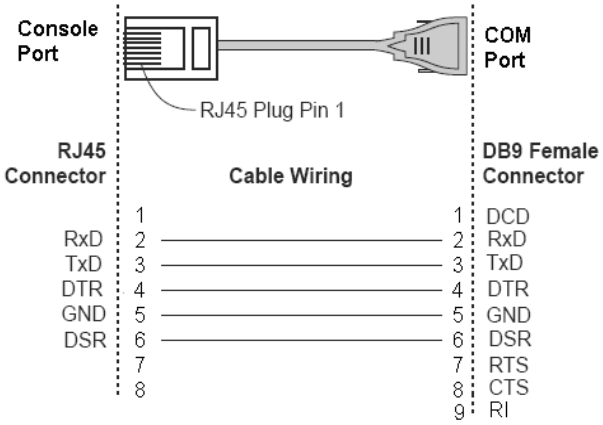
Remark:
The Switch features automatic MDI/MDI-X and NWay on RJ-45 port.

Console Cable (RJ-45 to DB9)

When connecting your Switch's console port to your COM port, use the provided console cable. The pin assignments are as follows.



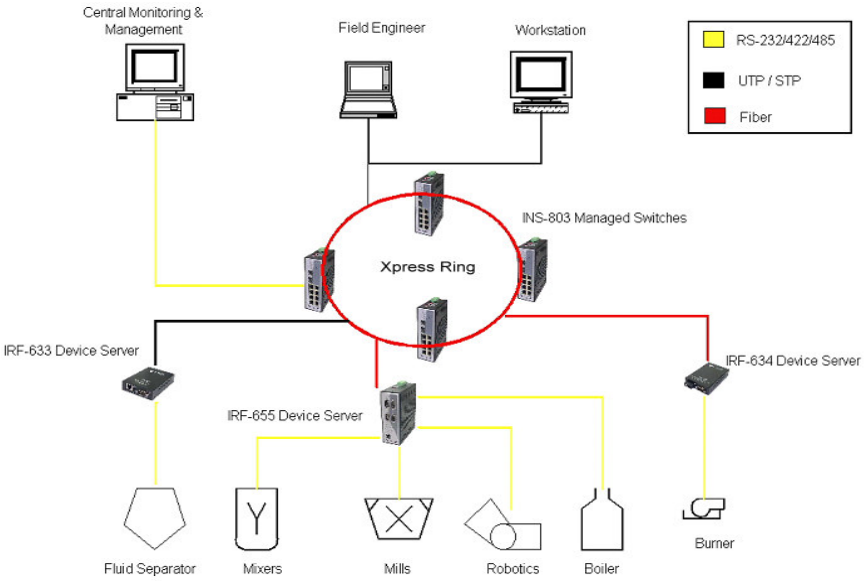
RJ-45 pin assignment



RJ-45 (8-pin) to DB9 (F) pin assignment

Application Diagram

The Switch was specially developed with a redundant link feature. This is particularly suited for Industrial applications that demand the utmost in reliability. The device comes with 4 copper and 4 fiber ports. With this design, a primary and a redundant link can be configured to ensure an "always on" connection exists, eliminating costly network downtime.



Appendix C

SNMP Trap List

1. Switch Traps Group (private)
   - Cold start
   - Warm start
   - Link up
   - Link down
   - System configuration change

2. MIB-II Traps
   - Cold start
   - Warm start
   - Link up
   - Link down
   - Authentication failure

Default Settings

The following tables contain the default settings that will be restored when the <System Restore Factory Default Settings> function is activated.

System Restore Factory Default Settings	
Description	Managed 7-Port + 2-slot Fiber Industrial Switch
Serial number	OOOOOOOOO1
Model Name	7+2+1-port Switch
Company Name	
Board Name	6700-00747-0100
Manufacture Time	0:0:0 0/0/0
System Name	7+2+1-port Switch
Location	
Contact Name	
Username	Admin
Password	
ip address	192.168.0.254
netmask	255.255.255.0
gateway	192.168.0.1

Port Setting							
	Type	**Admin**	**Speed**	**Duplex**	**Link**	**Auto**	**FlowCtl**
Port 1	RJ45	enable	100M	full	up	on	Disable
Port 2	RJ45	enable	100M	full	up	on	Disable
Port 3	RJ45	enable	100M	full	up	on	Disable
Port 4	RJ45	enable	100M	full	up	on	Disable
Port 5	RJ45	enable	100M	full	up	on	Disable
Port 6	RJ45	enable	100M	full	up	on	Disable
Port 7	RJ45	enable	100M	full	up	on	Disable
Port 8	Fiber	enable	100M	full	up	on	Disable
Port 9	Fiber	enable	100M	full	up	on	Disable
RX/TX Counter Mode			Good Mode				

Bridge Configurations	
Spanning Tree	Disabled
Bridge Priority	32768
Hello Time	2
Forward delay	15
Max age	20
Age time	19

Spanning Tree Port Configuration			
Port	Type	Priority	Cost
1	RJ-45	128	19
2	RJ-45	128	19
3	RJ-45	128	19
4	RJ-45	128	19
5	RJ-45	128	19
6	RJ-45	128	19
7	RJ-45	128	19
8	Fiber	128	19
9	Fiber	128	19

Port-Based VLAN Configuration

	Members								
PortID	1	2	3	4	5	6	7	8	9
1	-	Y	Y	Y	Y	Y	Y	Y	Y
2	Y	-	Y	Y	Y	Y	Y	Y	Y
3	Y	Y	-	Y	Y	Y	Y	Y	Y
4	Y	Y	Y	-	Y	Y	Y	Y	Y
5	Y	Y	Y	Y	-	Y	Y	Y	Y
6	Y	Y	Y	Y	Y	-	Y	Y	Y
7	Y	Y	Y	Y	Y	Y	-	Y	Y
8	Y	Y	Y	Y	Y	Y	Y	-	Y
9	Y	Y	Y	Y	Y	Y	Y	Y	-

Tag-Based VLAN Configuration

VLAN 1: Port 1 ~ 8: Untag

PortID	VID	Priority	Ingress_filter		Isolated
1	1	0	NonMember: Drop	Untagged: Forward	Disabled
2	1	0	NonMember: Drop	Untagged: Forward	Disabled
3	1	0	NonMember: Drop	Untagged: Forward	Disabled
4	1	0	NonMember: Drop	Untagged: Forward	Disabled
5	1	0	NonMember: Drop	Untagged: Forward	Disabled
6	1	0	NonMember: Drop	Untagged: Forward	Disabled
7	1	0	NonMember: Drop	Untagged: Forward	Disabled
8	1	0	NonMember: Drop	Untagged: Forward	Disabled
9	1	0	NonMember: Drop	Untagged: Forward	Disabled

Jumbo Packet / Multicast Rate Configuration
Jumbo Packet Length: 1535 **[**1522|1535**]** Bytes
Port Multicast Rate Limit
==========
1 100 **[**3 | 6 | 12 | 100**]** %
2 100 **[**3 | 6 | 12 | 100**]** %
3 100 **[**3 | 6 | 12 | 100**]** %
4 100 **[**3 | 6 | 12 | 100**]** %
5 100 **[**3 | 6 | 12 | 100**]** %
6 100 **[**3 | 6 | 12 | 100**]** %
7 100 **[**3 | 6 | 12 | 100**]** %
8 100 **[**3 | 6 | 12 | 100**]** %
9 100 **[**3 | 6 | 12 | 100**]** %

Back-up Configuration Variables	
SNMP	System name
	Location
	Contact name
username	
password	
IP address	
Netmask	
Gateway	
Port setting content	Name, speed, duplex, auto
Bridge Configuration	
Spanning Tree Port Configuration	
VLAN Configuration	
Jumbo Packet / Multicast Rate Configuration	

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